

THE UNIVERSITY OF KANSAS SCIENCE BULLETIN

VOL. XXXVI, Pt. I]

JUNE 1, 1954

[No. 7

The Genus *Rheumatobates* Bergroth (Hemiptera-Gerridae)¹

BY

H. B. HUNGERFORD

University of Kansas, Lawrence

ABSTRACT: This revision of the genus *Rheumatobates* removes it from the subfamily Halobatinae in the Gerridae to the subfamily Rhagadotarsinae. A key to twenty-three species and four subspecies is given with drawings of all species. *Rheumatobates* Bergroth 1892 includes as synonyms—*Hymenobates* Uhler 1894, *Telmatobates* Bergroth 1898 and *Hynesia* China 1943.

Rheumatobates drakei from British Guiana, *Rheumatobates spinosus* from Rio Purús, Brasil and *Rheumatobates crassifemur schroederi* from Ceará, Brasil are described as new.

The following are considered synonyms—*Rheumatobates wrighti* Drake and Harris 1937 syn. of *R. bonariensis* (Berg) 1898 . . . *Rheumatobates crinitus* Herring 1949 syn. of *R. vegatus* Drake 1942.

THE GENUS RHEUMATOBATES

Rheumatobates is a New World genus of small water striders seldom over three millimeters in length and traditionally placed in the family Gerridae. It has no close relatives in the Western Hemisphere. The females are provided with an ovipositer for inserting the eggs into plant tissues, a character shared only by the genus *Rhagadotarsus* Breddin which is represented by the species *R. kraepelini* Breddin recorded from China, Formosa, Philippines, India, and Java, and I can add Sumatra and Burma, and *R. (Caprivia) hutchinsoni* China from Africa. For these species Lundblad² 1933 erected the Subfamily Rhagadotarsinae which he characterized as having:

1. The body dorsoventrally more or less compressed.
2. The head broad and short.

1. Contribution from University of Michigan Biological Station and No. 840, Department of Entomology, University of Kansas, Lawrence.

2. Lundblad, O. Zur Kenntnis der aquatilen und semiaquatilen Hemipteren von Sumatra, Java und Bali.—Archiv für Hydrobiol., Suppl., Bd. 12, 1933, pp. 411-412.

3. The region in front of the antennae not drawn out, the genae, as in the Hebridae, strongly formed and, as rounded disks, embrace the base of the rostrum. This is a special characteristic (according to Lundblad).

4. The eyes very large, prominent, the inner margins not concave, but descending obliquely toward the posterior.

5. Antennae of moderate length, first segment longest, accessory segments not present.

6. Rostrum reaching down between the front coxae.

7. Pronotum in the apterous form short, transverse, or in winged forms of moderate length covering the mesonotum with the posterolateral edges forming a half circle.

8. Mesonotum extensive with a median longitudinal furrow.

9. Mesonotum and mesopleurae separated by a longitudinal line.

10. Front legs strongly specialized with stout long femora, short tibiae and tarsi, the last tarsal segment much longer than the first and deeply cleft, the claws inserted in the cleft.

11. Hind legs much shorter than the middle legs.

12. Abdominal tip long drawn out in both sexes.

Most of the above statements apply also to *Rheumatobates*. Moreover both *Rhagadotarsus* and *Rheumatobates* have a median longitudinal line on the vertex of the head that is lacking in other Gerrids. While the genae are less conspicuous in *Rheumatobates* and the venation of the hemelytra is different in these two genera, I think they certainly belong in the same Subfamily and would remove *Rheumatobates* from the Halobatinae and place it in the Rhagadotarsinae.

That species in this strange group have led to the erection of new genera is not surprising. *Hymenobates* Uhler 1894 and *Telmatobates* Berg 1898 are undoubted synonyms of *Rheumatobates* Bergroth. In my studies of all the species of *Rheumatobates* I can find no line of demarcation to separate *Hynesia* China 1943 from *Rheumatobates* Bergroth 1892. Even the distinct bridgelike structure surrounding the dorsal shaft of the vesica in the male genitalia is not absent from some *Rheumatobates*, nine species of which have unmodified hind femora in the males and seven species of which have unmodified antennae in the males. No character of the head or thorax will separate *Hynesia* from *Rheumatobates*, the genae are slightly better developed in the two species of *Hynesia* than in some of the *Rheumatobates* but not in all. I am obliged therefore to consider *Hynesia* another synonym of *Rheumatobates*.

The genus *Rheumatobates* is one of the most remarkable groups of insects in the Hemiptera. All of the species are small gregarious surface striders and apterous adults far outnumber the winged forms so that they are overlooked by most collectors who mistake them for small nymphs of larger striders. For this reason these bizarre little bugs are not as well represented in collections as they deserve. The curious modifications of the antennae and legs of the males of many species are strange indeed!

HISTORY OF THE GENUS

At the meeting of the New York Microscopical Society on May 15, 1891, Rev. J. L. Zabriskie exhibited "A curious unknown, aquatic, hemipterous larva" that he said was captured on July 11th, 1890, in a stream of the waterworks, Flatbush, Long Island. The minutes of this meeting were published in the October number of the Journal of the New York Microscopical Society (vol. 7, no. 4, 1891, pp. 128-129) and here we find Mr. Zabriskie's description and a creditable outline drawing of "Unknown aquatic larva. Magnified 10 diameters." The drawing is easily recognized as that of an adult apterous male water strider. Evidently he sent a sketch of the insect to C. V. Riley of the Division of Entomology in the U. S. Dept. of Agriculture at Washington, D. C., for determination, and at Riley's request forwarded the slide from which he had made the sketch. From the slide Riley recognized the insect as a member of the family Hydrobatidae (now Gerridae) and published a new drawing and description of it under the title "An Interesting Aquatic Bug" in *Insect Life*, vol. 4, Dec. 1891, pp. 198-200. He wrote, "It is impossible to say whether it is an immature or an adult form, but if adult, it will undoubtedly form a new genus in the family." When Riley's article came to the attention of Dr. E. Bergroth of Tammerfors, Finland he wrote a little note which was published in *Insect Life* vol. 4, June, 1892, p. 321. In this he recognized the drawing published by Riley as of an adult male insect and named it *Rheumatobates rileyi*, new genus and new species, stating that, "The presence of two ocelli (which Riley in his description said it possessed) and the remarkable structure of the antennae and of the hind femora are good generic characters of this insect."

Actually Riley was wrong in saying they have two ocelli for they have none and we now know of several species in which the males have neither modified antennae nor twisted legs.

Nevertheless, at the time Bergroth named *Rheumatobates rileyi*

from Riley's drawing and description, only the single apterous male was known and Riley's published drawing³ of it has adorned the covers of the Proceedings of the Entomological Society of Washington since the beginning of volume 3 in 1893!

Riley was intrigued by this strange insect and was delighted when Mr. O. Heidemann donated to the National Museum a number of specimens collected along the Potomac Canal near Washington. In this lot besides males like *Rheumatobates rileyi* Bergroth, figured by Riley, there were females and nymphs and other males with unmodified hind legs. These latter males Riley considered "normal males" of *Rheumatobates rileyi* and the kind he had figured with bowed hind femora as "abnormal males." Therefore he published another paper in *Insect Life*, vol. 5, January, 1893, pp. 189-194, describing and figuring the "normal form" male of *R. rileyi*, the female and nymph, using figures made for him by Heidemann. In 1895 Meinert described Riley's *R. rileyi* "normal male" as *R. tenuipes* and "modified hind femora in males" was dropped from the generic concept of *Rheumatobates*. In 1932 Drake and Harris described *R. clanis* a species with normal antennae and legs, and in 1936 I described *R. minutus* and our concept of the genus was again modified and the strange and obvious characters that led Bergroth to establish the genus have been dropped. Nevertheless the genus *Rheumatobates* is a valid group of related species with a striking and pleasing assortment of specific characters as shown on the plates accompanying this paper.

Bergroth, 1908, gave a key to four species. Schroeder 1931 keyed out eight species and three varieties and did not mention *R. bonariensis* (Bergroth). Drake and Hottes 1951 listed twenty species and four varieties.

In this paper I am recognizing twenty-three species (two new) and four subspecies (one new). It is my conclusion, that *R. crassifemur esakii* Schroeder should be returned to the subspecies status as it was described; that there exists another subspecies *R. crassifemur schroederi* subsp. nov. that *R. crinitus* Herring is not even a good subspecies of *R. vegatus* but a synonym; that *R. wrighti* Drake and Harris is a synonym of *R. bonariensis* (Berg.); and that *R. imitator* (Uhler), *R. bergrothi* Meinert and *R. meinerti* Schroeder are good species.

3. Heidemann probably made the drawing.

Rheumatobates Bergroth

- 1892 Bergroth, E., *Insect Life*, vol. 4, p. 321 (citation of Riley's paper in *Insect Life*, vol. 4, p. 198, with brief statement of generic characters).
- 1896 Bianchi, V., *Annuaire du Musée Zoologique de l'Académie Impériale des Sciences de St. Pétersbourg* p. 71 (p. 3 of *Extrait*) (key to genera of Halobatinae).
- 1906 Kirkaldy, G. W., *Trans. Amer. Ent. Soc.*, vol. 32, p. 156 (list of Genera).
- 1908 Bergroth, E., *Ohio Naturalist*, vol. 8, pp. 379-382 (key to known species and placing *Hymenobates* Uhler 1894 in synonymy).
- 1909 Kirkaldy, G. W., and Torre-Bueno, J. R. de la, *Proc. Ent. Soc. Wash.* X, p. 212 (catalog).
- 1911 Torre-Bueno, J. R. de la, *Trans. Amer. Ent. Soc.*, vol. 37, pp. 245-246 (key to species of Atlantic States).
- 1911 Torre-Bueno, J. R. de la, *Can. Ent.*, vol. 43, p. 228 (*Halobaptopsis* Ashmead 1897 in part).
- 1916 Van Duzee, Edward P., *Check List of the Hemiptera of America, North of Mexico*, p. 49 (publ. by New York Ent. Soc.).
- 1917 Van Duzee, Edward P., *Catalog of the Hemiptera of America, North of Mexico*, p. 431 (Univ. of California Publ. Tech. Bull. College of Agri., Agricultural Exp. Sta. Entomology, Vol. 2).
- 1920 Hungerford, H. B., *Kansas Univ. Science Bull.*, vol. 11, p. 116; 120 (key and life history notes).
- 1923 Torre-Bueno, J. R. de la, in *Hemiptera of Connecticut*, p. 663 (Connecticut State Geol. and Nat. History Surv. Bull. No. 34).
- 1926 Blatchley, W. S., *Heteroptera or True Bugs of Eastern North America*, pp. 981-985 (key).
- 1926 Esaki, Teiso, *Annales Musei Nationalis Hungarici*, vol. 23, p. 148.
- 1931 Schroeder, Herman O., *Kansas Univ. Science Bull.*, vol. 20, no. 2, pp. 63-99, Plates VI-XI (key to known species).
- 1936 Deay, Howard O., and Gould, George E., *American Midland Naturalist*, vol. 17, No. 4, pp. 764-765.
- 1942 Drake, C. J., and Harris, H. M., *Rev. Brasil Biol.*, 2(4), p. 402 (lists the species).
- 1943 China, W. E., *Proc. Royal Ent. Soc. London Ser. B.*, vol. 12, pp. 5-6 (comparative note).
- 1950 Larsen, Ossian, *Opuscula Entomologica*, vol. 15, 1, p. 40 (reduction of flight apparatus).
- 1951 Drake, C. J., and Hottes, F. C., *Proc. Biol. Soc. Washington*, vol. 64, pp. 154-155 (list of known species).

The following are synonyms:

- 1894 *Hymenobates* Uhler, P. R., *Proc. Zool. Soc. London* for 1894, p. 214 [Erected for *R. imitator* (Uhler)].
- 1897 *Halobaptopsis* Ashmead, W. H. (in part) (*nec* Bianchi 1896), *Can. Ent.*, vol. 29, p. 56 (see 1911 Torre-Bueno, *Can. Ent.*, vol. 43, p. 226).
- 1898 *Telmatobates* Berg, Carolo., *Comunicaciones del Museo Nacional de Buenos Aires*, vol. 1, no. 1, pp. 5-6 [Erected for *R. bonariensis* (Berg)].
- 1943 *Hynesia* China, W. E., *Proc. Royal Ent. Soc. London*, vol. 12, Pts. 5-6, Ser. B., pp. 71-72 (new genus for *H. trinitatis* and *H. mangrovensis* from Trinidad, B. W. I.).

Very small oblong or oblong-oval waterstriders, apterous or winged, with middle femora longer than hind femora. Head short, transverse, the eyes coarsely faceted, hemispherical, protruding beyond the prothorax laterally, and embracing it anteriorly. The vertex of the head with a median longitudinal shining or depressed line. The genae, disklike, and appressed against the base of the first segment of the beak, which is four segmented, short, surpassing

the tip of the front coxae. The antennae four-segmented without subsegments; in the males the basal segment often, but not always, the stoutest or longest. In many species the antennal segments of the male are strangely modified, as if for grasping, while they are normal in all females and in the males of some species. The pronotum short, the rear margin concave or sinuately concave in apterous forms. In winged forms the pronotum covers the mesonotum and is rounded behind. In apterous forms the mesonotum is elongate with a median longitudinal line. The genital segments are elongate in both sexes and appear more or less cylindrical in dorsal view. The male ninth segment lacks the claspers and the female is provided with an ovipositor for inserting the eggs in plant tissue.

The front legs are short. The femur usually as long or longer than the tibia and tarsus and, in the males often stout and provided with spines. The middle legs very long and in the males of some species modified. The hind legs much shorter than middle legs—normal in all females and some males but strangely modified in the males of certain species.

The original descriptions of many species have devoted considerable space to color and have had too little regard for the wide color variation that may occur within a species. Since I have given annotated bibliographies and have submitted drawings for all species I have shortened descriptions to include only those characters needed to verify the determination made by the use of the dichotomous key.

The Genus RHEUMATOBATES Bergroth

(Key to males)

	PAGE
1. Hind femur straight, segments of the leg unmodified	2
Hind femur not straight, some other leg segments may also be incrassate curved, twisted or spurred	16
2.(1) Anterior femur stout with a tuft of stout hairs on anterior margin	3
Anterior femur may be stout but lacks tuft of stout hairs on anterior margin	4
3.(2) Anterior femur with a dense fringe of very long hairs curved toward apex of femur. Females with anterolateral margin of head yellow	p. 536
<i>R. (Hynesia) trinitatis</i>	
Anterior femur without hair fringe described above. Females with anterolateral margin of head black,	
<i>R. (Hynesia) mangrovensis</i>	p. 537
4.(2) First antennal segment not incrassate, not possessing a stout hair tuft beneath	5
First antennal segment incrassate, possessing a stout tuft of hairs beneath	13

	PAGE
5.(4) First antennal segment longest	6
First antennal segment not longest	10
6.(5) Front femur with a conspicuous crooked row of long stout spines beneath that is double on basal third . . . <i>R. clavis</i> p.	539
Front femur not as above	7
7.(6) Last abdominal and first genital segment not deeply longi- tudinally grooved beneath	8
Last abdominal and first genital segment deeply, longi- tudinally grooved beneath	9
8.(7) First genital broad, flat to slightly concave beneath with hairs on the sides. Front tibia with black peglike pro- jections on inner margin . . . <i>R. petilus</i> p.	540
First genital narrow, rounded beneath, not hairy, <i>R. drakei</i> sp. nov. p.	541
9.(7) First antennal segment black <i>R. bonariensis</i> p.	542
First antennal segment with basal half pale . . . <i>R. b. wrighti</i> ⁴ p.	542
10.(5) Anterior femur considerably thicker than middle femur (17:11). Fourth antennal segment longest. First genital segment hairy	11
Anterior femur a little thicker than middle femur (12:10). Third antennal segment longest. First genital segment not hairy	12
11.(10) Middle femur at least .9 length of insect <i>R. vegatus</i> ⁵ p.	544
Middle femur not more than .8 length of insect . . . <i>R. v. crinitus</i> p.	544
12.(10) Thorax mostly black above <i>R. minutus</i> p.	545
Thorax mostly flavous above <i>R. m. flavidus</i> p.	546
13.(4) Middle femur distinctly bowed with a protuberance near the apex	14
Middle femur straight	15
14.(13) Hind tibia straight <i>R. creaseri</i> p.	547
Hind tibia moderately bowed <i>R. citatus</i> p.	548
15.(13) Middle tibia with basal third strongly arched or curved, then straight to tip <i>R. praeposterus</i> p.	549
Middle tibia straight <i>R. tenuipes</i> p.	550
16.(1) Hind trochanter smaller than hind coxa	17
Hind trochanter incrassate, as thick as coxa	22
17.(16) Front femur, above with a large prominent tubercle a little beyond its base. Abdomen beneath concave, the mar- gins of the segments beset with extremely long hairs, strongly curved downward and inward, their tips nearly touching <i>R. carvalhoi</i> p.	551
Front femur without the above tubercle. Abdomen with- out the hairs described above	18

4. I have a long series taken from one place. All the males run to *R. bonariensis* (Bergroth) and females to *R. b. wrighti* Drake and Harris. Females in Bergroth's type series run to *R. wrighti* Drake and Harris.

5. I have not seen a specimen with middle femur "at least .9 length of insect," and do not believe *crinitus* is even a good subspecies.

- 18.(17) Hind femur without a median T-shaped projection on its inner surface 19
 Hind femur with a median T-shaped projection on its inner surface *R. mexicanus* p. 552
- 19.(18) Hind femur hairless or at most with very short fine hair along the entire inner margin but may have some spinelike hair clusters at tip 20
 Hind femur with some long hairs 21
- 20.(19) Posterior margin of middle femur with a row of long straight hairs, base and tip bare *R. hungerfordi* p. 554
 Middle femur nearly hairless except near tip *R. trulliger* p. 555
- 21.(19) Spur on terminal antennal segment at or beyond the middle, *R. rileyi* p. 557
 Spur on terminal antennal segment before the middle, *R. r. palosi* p. 560
- 22.(16) Hind trochanter with a very long basal spur, *R. spinosus* sp. nov. p. 562
 Hind trochanter not so armed 23
- 23.(22) Hind trochanter inserted beyond the base of the femur. The femur without a T-shaped or anchor-shaped structure on its inner surface 24
 Distal end of hind trochanter joining basal end of femur. The femur with a T-shaped or anchor-shaped structure on its inner surface 27
- 24.(23) A dense tuft of bristles extending forward from the basal extremity of the hind femur *R. klagei* p. 563
 Basal extremity of hind femur bare 25
- 25.(24) Terminal antennal segment with a fairly uniform row of strong setae on the dorsolateral margin 26
 Terminal antennal segment with some very long stout setae in the dorsolateral marginal row *R. crassifemur esakii* p. 565
- 26.(25) Basal lobe of hind trochanter densely margined beneath with long hair *R. crassifemur crassifemur* p. 564
 Basal lobe of hind trochanter not densely margined beneath with long hair *R. crassifemur schroederi* subsp. nov. p. 566
- 27.(23) Hind trochanter not quite half as long as femur *R. imitator* p. 567
 Hind trochanter at least four fifths as long as femur 28
- 28.(27) Intermediate tibia sinuate *R. bergrothi* p. 568
 Intermediate tibia straight *R. meinerti* p. 569

Rheumatobates trinitatis (China)

Plate VIII, figs. 8, 8a, 8b

- 1943 *Hynesia trinitatis* China, W. E., Proc. Royal Soc. London, vol. 12, pts. 5-6, ser. B, pp. 72-77, figs 1, 2a, and 4 (desc. from Trinidad, B. W. I.).
 1948 *Hynesia trinitatis* Hynes, H. B. N., Trans. Royal Ent. Soc. London, vol. 99, p. 348.

Dr. China gives a splendid description and fine illustrations of this species so that it will be readily recognized.

Size: Apterous male 3.1 mm long and width across the middle of the mesonotum 1 mm. The apterous female is 3.7 mm long and 1.2 mm across the base of mesonotum.

Color: The detailed color description and the illustrations of both sexes by the author fit the paratypes I have seen very well indeed. It is probable that eventually some variation will be found but the large diamond-shaped dull black spot on the ochreous yellow head in both sexes and the two brown to black longitudinal stripes on the yellow front femur of the male may be distinctive.

Structural characteristics: Shape of the head characteristic of *Rheumatobates* with the usual curved bristles arising from the caudo-lateral surface of the eyes and others in front of the eyes. The antenna of the male with basal segment swollen and strongly curved upward in its middle, as seen in side view, other segments normal. The segmental formula being: 1st: 2nd: 3rd: 4th.: 47: 16: 14: 61. In the female: 30: 13: 19: 42. The front femur of the male somewhat incrassate, the basal half more or less compressed dorso-ventrally, the apical half compressed laterally so that the whole femur has a twisted appearance. (see Plate VIII, fig. 8b). Other legs of the male unmodified.

Location of types: In British Museum.

Data on distribution: TRINIDAD, B. W. I. Described from Trinidad, from 7 males and 18 females taken by N. Hynes under mangrove.

Rheumatobates mangrovensis (China)

Plate VIII, figs. 7, 7a, 7b

1943 *Hynesia mangrovensis* China, W. E., Proc. Royal Ent. Soc. London, vol. 12, pts. 5-6, ser. B. pp. 77-80, figs. 2b, 3, and 5 (desc. from Trinidad, B. W. I.).

1948 *Hynesia mangrovensis* Hynes, H. B. N., Trans. Royal Ent. Soc. London, vol. 99, p. 348.

This species is also described in detail and well illustrated.

Size: Apterous male 2.8 mm long, width across middle of the mesonotum .9 mm. The apterous female is 3.3 mm long and 1.1 mm across the base of the mesonotum.

Color: The color description and illustrations of both sexes by the author fit the paratypes I have seen. Probably some color variation will be found but the broad fulvous, somewhat U-shaped band on the base of the vertex with the rest of the head black as seen from above may prove constant. The front femur of the male is less strikingly marked and darker than in the preceding species.

Structural characteristics: Head of normal shape and as in *R. trinitatis* has the genae more developed than in some *Rheumatobates* species. The antenna of the male slightly modified, the first segment a little thicker than the others, slightly curved in both the dorsoventral and lateral planes and having two stout spines that are heavier than similar spines on the first segment of *R. trinitatis*; the second segment has one spine in both species. The antennal formula of the male being: 1st: 2d: 3rd: 4th.: 50: 16: 14: 24; for the female: 31: 13: 17: 25. The front femur of the male incrassate, dorsal surface (upper side) in the middle somewhat compressed above posterior edge, basal fourth of posterior side with a short shallow groove bounded at base on upperside by a distinct lobe or prominence; apical half of posterior (inner) side with a close-set row of strong black spines, longest in the middle, beginning at apex of upper posterior edge and curving inwards (*i. e.* downwards) to form at the middle of the femur an arc of three or four longer spines directed upwards instead of backwards; the lower edge of posterior side in middle with a much shorter, rather irregular row of black spines of varying lengths extending basally to well beyond end of the upper row of spines; ventral surface with two close-set convergent stout spines near anterior edge, placed about two thirds of length of femur from its base; also with a small short tuft of exceedingly close-set bristles, placed away from anterior edge, less than one half of length of femur from base; apical third of anterior (outer) side with dense but rather short pubescence; front tibia broad, scarcely swollen and laterally compressed, unarmed and without the tooth on the anterior side present in *H. trinitatis*. Other legs of male unmodified.

Location of types: In British Museum.

Data on distribution: TRINIDAD, B. W. I. Described from Trinidad, B. W. I., from 29 males and 34 females from Yarra River taken by N. Hynes.

Comparative notes: "Apart from the very differently shaped and armed antennae and front femora in the male, this species can be readily distinguished in both sexes from *H. trinitatis* by the black instead of yellow anterior lateral region of the head in front of the eyes; by the much wider, more transverse yellow spot in middle of pronotum; by the presence of a narrow longitudinal fulvous stripe down the middle of mesonotum in male and by the much broader mesonotal stripe in the female: the yellow stripe down the middle of the eighth abdominal tergite in female is much broader than in *H. trinitatis*."

Rheumatobates clanis Drake and Harris

Plate VII, figs. 6 and 6a

- 1932 *Rheumatobates clanis* Drake, C. J., and Harris, H. M., Pan. Pacific Ent., vol. 8, No. 4, p. 157-158 (desc. from British Honduras).
1936 *Rheumatobates clanis* Hungerford, H. B., Carnegie Inst. of Washington, Pub. No. 457, p. 148 (in key).
1942 *Rheumatobates clanis* Drake, C. J., and Harris, H. M., Rev. Brasil Biol. Soc., 2 (4), p. 402 (British Honduras).
1949 *Rheumatobates clanis* Herring, Jon, Florida Ent., vol. 32, No. 4, p. 160 (mentions only).
1951 *Rheumatobates clanis* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc. Wash., vol. 44, Pl. XIII a (British Honduras).

Size: Length of apterous males 2.1 mm to 2.38 mm ⁶ length of apterous females 2.73 mm to 3.17 mm ⁶.

Color: Velvety black with yellowish to fulvous markings. There is considerable variation in the extent of the pale markings. The rear margin of the vertex with flavous band that may be narrow or very broad; a quadrate, usually transverse pale spot on pronotum. Usually an elongate pale stripe on mesonotum although this may be lacking even in females. Sides of thorax more or less fulvous; a pale spot on the first genital of female.

Structural characteristics: The males of this species have the antennae, middle and hind legs unmodified. The antennal formula of the male is given by the authors as 27: 8: 11: 17 and for the female as 20: 8: 13: 18. The front legs of the male are stout and hairy, the femur incrassate with a crooked row of spines along the posterior margin beneath that becomes a double row on the basal half, beneath which there is often a heavy mat of light colored hair. In both sexes the pronotum is short with the sides strongly produced posteriorly. The first genital segment of the female with numerous long black setalike hairs as viewed from above.

Location of types: In the author's collection at Ames, Iowa, and three paratypes in Francis Huntington Snow Collection, University of Kansas.

Data on distribution: Described from apterous holotype male, apterous allotype female and 350 males and females taken with the types in Río Grande, British Honduras.

We have in the Francis Huntington Snow Museum of the University of Kansas the following: BRITISH HONDURAS: Río Grande, British Honduras, C. A., Nov. 1931. 1 ♂, 2 ♀ ♀ paratypes; February 1932, J. J. White. 48 ♂ ♂, 71 ♀ ♀. (6 ♂ ♂ have no pale spot on mesonotum); March 1932, J. J. White. 13 ♂ ♂, 146 ♀ ♀.

6. This maximum figure is the length given by the authors. I have seen none so large. Even paratypes are nearer the minimum figure

(3 ♂♂ have no pale spot on mesonotum); Punta Gorda, British Honduras, C. A., Aug. 1934. Purch. from Parish. 17 ♂♂, 7 ♀♀. (In this series 3 ♀♀ have the broad pale stripe on mesonotum, 3 ♀♀ with greatly reduced stripe, and 1 ♀ with black mesonotum. All the males have black mesonotum.) CUBA: Río Yumuri, Matanzas Prov. Matanzas, Cuba, June 11, 1932. P. J. Bermudez 97 ♂♂, 66 ♀♀. This is a new distribution record.

Rheumatobates petilus Drake and Hottes

Plate VII, fig. 1.

1951 *Rheumatobates petilus* Drake, C. J. and Hottes, F. C., Proc. Biol. Soc. Washington, vol. 64, pp. 147-149. (Desc. from Mex.)

Size: Length of apterous male 1.89 mm-2.3 mm⁷; length of female 2.55 mm⁷-2.77 mm.

Color: Brownish, to brownish black, with markings that are fulvous to whitish testaceous. The base of vertex of head with a broad fulvous U-shaped to V-shaped band. The pale pronotal spot, a truncated cone, the basal angles of which may be extended along the caudal margin of the pronotum for some distance; another pale elongate spot on lateral margin of pronotum behind each eye. The mesonotum usually has a fulvous to pale longitudinal median line or band. Another irregular pale figure lies laterally above the middle acetabula which are dark. Thoracic venter pale, abdominal venter dark in males. Females with a pale streak on the tergite of the first genital.

Structural characteristics: The males of this species have the antennae, middle and hind legs unmodified. The antennal formula of the male is given by the authors as 30: 12: 21: 26. For the female I find it to be the same. The front femur of the male is incrassate with a row of six or seven stout spines beneath the rear margin. The most striking characteristic of the species, not mentioned in the description, is a protuberance near the inner base of the front tibia of the male that bears two or three stout pegs. The first genital segment of the male is broad, flat to slightly concave beneath, with hairs on the sides.

Location of types: In the Drake Collection, Ames, Iowa.

Data on distribution: Described from holotype, allotype and two female paratypes taken from a large fresh water pond, Acapulco, Mexico, Aug. 3, 1951, C. J. Drake and F. C. Hottes.

7. Measurement given by authors. My series compared with the types by Dr. Drake have apterous males that are 1.89 mm and apterous females that are 2.73 mm to 2.77 mm.

We have in the Francis Huntington Snow Museum the following: MEXICO: Hda. Balchakij, Río Champán, Campeche, Sept. 11, 1936, H. D. Thomas, 19 ♂♂, 12 ♀♀. Some were compared with the types by Dr. Drake.

Rheumatobates drakei sp. nov.

Plate VII, fig. 2.

Size: Length of apterous male 1.728 mm; width of head .68 mm; greatest width of body .796 mm. Length of apterous female 2.27 mm; width of head .69 mm; greatest width of body 1 mm.

Color: Black with a transverse rectangular pale spot on pronotum in both sexes. The males are otherwise black above, with venter black. The bases of antennae and front femora, all coxae and trochanters pale. The females above have large lateral spots on mesothorax and first genital segment pale, sometimes the tips of the connexivum are also pale and in some specimens there is a narrow median pale line on mesonotum. The venter is like the male except that the distal half of the last abdominal and first genital segment are pale.

Structural characteristics: The antennae and hind legs of the male unmodified. The segmental formula of antenna of male is: 1st: 2nd: 3rd: 4th.: 45: 18: 34: 28; for the female it is: 1st: 2nd: 3rd: 4th.: 34: 18: 35: 30. Front legs of male stouter than in female. The male femur plainly thicker than the middle femur (15:11) and both femur and tibia slightly curved. The femur with a row of about ten spines on rear margin. The front leg segments of the male have the following formula: Femur: tibia: tarsus.: 83: 65: 32. For the female: Femur: tibia: tarsus.: 73: 48: 32 with the femur no stouter than the middle femur but provided with a row of long spines on rear margin. The middle leg of male unmodified and long, the femur as long as the body, the segmental formula being: Femur: tibia: 1st tarsal: 2nd tarsal.: 225: 216: 92: 34. For the female: 225: 202: 107: 35. Few long hairs in either sex.

The posterior leg of male unmodified, the segmental formula being: Femur: tibia: 1st tarsal: 2nd tarsal.: 110: 123: 17: 21. For the female: 120: 102: 20: 25. Few long hairs in either sex. Metasternum of male depressed; ventral abdominal segments rounded, not hairy, the last abdominal slightly longer than the two preceding segments and nearly as long as the first genital. In dorsal view, the first genital, with sides tapering and not quite as long as last two

abdominal segments, not hairy. In the female dorsal view, the first genital a little shorter than the second and sparsely haired.

Location of types: Holotype male, allotype and thirty paratypes (17 ♂♂—13 ♀♀) are in the Francis Huntington Snow Museum of University of Kansas and bear the label "British Guiana, Supuruni Creek, Aug. 31, 1937 S. Harris."

Comparative notes: This is another little species with unmodified antennae and legs in the male. The first antennal segment of the male is longest which separates it from *R. minutus* Hungerford. Its antennae are shorter and stouter than in *R. petilus* Drake and the front legs of the male not so stout.

Since most of the other workers who have described valid species in this curious genus have been honored by naming species for them I am naming this species for Dr. Carl J. Drake who has described six species and two subspecies of *Rheumatobates* and who has had a lifelong interest in the semiaquatic Hemiptera.

Rheumatobates bonariensis (Berg)

Plate VII, fig. 3.

- 1898 *Telematobates bonariensis* Berg, Carolo, Comunicaciones del Museo Nacional de Buenos Aires T. 1, no. 1, pp. 5-6 (desc. from Buenos Aires, Argentina).
 1909 *Telematobates bonariensis* Kirkaldy, G. W., and Torre-Bueno, J. R. de la, Proc. of the Entomological Soc. of Washington, vol. 10, p. 211.
 1938 *Rheumatobates bonariensis* (Berg) Drake, C. J., and Harris, H. M., Notas del Museo de la Plata, T. 3, Zoologia no. 13, p. 201 (examined Berg's types).
 1942 *Rheumatobates bonariensis* Drake, C. J., and Harris, H. M., Rev. Brasil Biol. 2(4), p. 402 (list the species).
 1951 *Rheumatobates bonariensis* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc. Washington, vol. 64, p. 154 (occurs with *R. bonariensis wrighti*).

The following are synonyms:

- 1937 *Rheumatobates wrighti* Drake, C. J., and Harris, H. M., Rev. de Entomologia, vol. 7, fasc. 4, pp. 360-361 (desc. from Buenos Aires).
 1942 *Rheumatobates bonariensis* var. *wrighti* Drake, C. J., and Harris, H. M., Rev. Brasil Biol., 2(4), p. 402
 1951 *Rheumatobates bonariensis* var. *wrighti* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc. Washington, vol. 64, p. 154. (They say it is found with typical form.)

I have a long series taken from one place. All the males have the first antennal segment dark and all the females have the basal half of first segment pale. Moreover the females I have seen from Berg's type series have the base of first antennal segment pale. Since according to the last reference (1951) both occur together I cannot accept *R. wrighti* as a subspecies.

Size: Length of males 1.89 mm to 2.1 mm; length of females 2.25 mm to 2.52 mm.

Color: Typically a black species with some gray pubescence, the only pale spot being on the pronotum. The base of the antennae pale in the females and in some of the males. Venter usually dark brown to black, the coxae, trochanters and base of femora may be pale.

Structural characteristics: Antennae unmodified but with tip of distal segment curved down in male. Segmental formula: 1st: 2nd: 3rd: 4th.: 45: 19: 30: 38. In female: 1st: 2nd: 3rd: 4th.: 30: 18: 28: 33. The tip of antenna not curved. Legs also unmodified in the male.

The most striking character separating this species from others is not mentioned either in the description of *R. bonariensis* by Berg or in the description of *R. wrighti* by Drake and Harris and that is that the last abdominal and first genital segments of the male are deeply, longitudinally grooved beneath.

Location of types: *Telmatobates bonariensis* in Museo de La Plata, Buenos Aires, Argentina. *Rheumatobates wrighti* in the Drake Collection at Ames, Iowa.

Data on distribution: Both *R. bonariensis* Berg and *R. wrighti* Drake and Harris were described from Buenos Aires, Argentina.

We have in the Francis Huntington Snow Museum the following: ARGENTINA: Buenos Aires. Carded specimens of *Telmatobates bonariensis* from the Kirkaldy Collection, probably from Berg's type series, 2 ♂♂ and 1 ♀; specimen from "Delta" compared with type of *T. bonariensis* 1 ♂. Another one labeled "Bs. As." compared with type of *T. bonariensis* by M. S. Pennington. PERÚ: Perú, S. A. June 6, 1937, F. Woytkowski, No. 3769, Dept. Huanuca, Vic. of Afilador, Jungle, 800 m. a. s. l. 2 ♀♀, 6 ♂♂. In these the base of antennae black in males, pale in females. BRAZIL: São Paulo, Brazil X, 1947, R. Plaumann. 1 ♂, 2 ♀♀ in these base of antennae black in males, pale in females; Jabora, Brazil, X, 1947, F. Plaumann. 7 ♂♂, 7 ♀♀ base of antennae pale in both sexes; Nova Teutonia, 27-11 La., 52-23 Lo., XII, 1946, Fritz Plaumann. 12 apterous ♂♂, 30 apterous ♀♀, 21 winged ♂♂, 34 winged ♀♀. In above base of antennae black in males, pale in females; Nova Teutonia, 27-11 La., 52-23 Lo., V, 1948, Fritz Plaumann. 9 apterous ♂♂, 20 apterous ♀♀. Base of antennae black in males, pale in females.

From the above it is evident that with the exception of the specimens from Jabora, Brazil, all the males would run out in the key to *R. bonariensis* Berg and the females to *R. wrighti* Drake and

Hottes and since Drake and Hottes (1951) say that the two occur together and I can find no structural distinctions they must be one species.

Rheumatobates vegatus Drake and Harris

Plate VII, fig. 5.

1942 *Rheumatobates vegatus* Drake, C. J., and Harris, H. M., Rev. Brasil Biol., 2(4), pp. 401-402. (Desc. from "Isle of Pines," Cuba.)

1949 *Rheumatobates vegatus* Herring, Jon L., Florida Ent., vol. 32, no. 4, p. 160. (Desc. *R. crinitus* from three counties in Florida from salt water and had Drake compare with *R. vegatus* Drake and Harris.)

1951 *Rheumatobates vegatus* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc. Washington, vol. 64, p. 149 (adds Porto Rico and makes *R. crinitus* Herring a variety). I consider *R. crinitus* Herring a synonym of *R. vegatus* Drake and Harris.

Size: Length of apterous male 2.00 mm to 2.24^s mm; length of apterous female 2.68 mm to 2.95^s mm.

Color: Dark brown to nearly black with lighter markings as shown in Herring's paper (figure on his Plate I), except for a pale triangular spot behind the eye that is not shown in his figure. When *R. vegatus* and *R. clanis* females occur together, as they do in Cuba, the narrow median longitudinal mesonotal pale line, the pale triangular spot behind the eye on the side of the prothorax (distinguishes males also) and dark connexivum will distinguish *R. vegatus* females.

Structural characteristics: The males of this species have the antennae, middle and hind legs unmodified. The antennal formula of the male: 20: 10: 15: 22; for the female: 20: 10: 18: 23. Front femur of male moderately swollen about the middle, posterior margin with a straight row of about ten stout spines, above the basal end of which is a row of four longer more slender spines. In both sexes the pronotum is short with the sides strongly produced posteriorly.

The first genital segment of the female less spiny than in *R. clanis*.

Location of types: *R. vegatus* was described from a single apterous male from "Isle of Pines," Cuba and is in the Drake Collection. *R. crinitus* Herring was described from 365 specimens from various places in Florida. The holotype, allotype and some paratypes in the museum of Zoology, University of Michigan and paratypes in several private collections and in the Francis Huntington Snow Collection at University of Kansas.

8. Even the paratypes of *R. crinitus* Herring that I have seen are nearer the minimum figure than these starred figures which Herring gives.

Data on distribution: *R. vegatus* Drake described from Cuba.

We have in the Francis Huntington Snow Museum the following: FLORIDA: Palm Beach Co. VI, 11, 1947, Jon Herring 3 ♂♂, 3 ♀♀ paratypes of *R. crinitus* Herring. CUBA: Río Yumuri, Matanzas Prov. Matanzas, Cuba, June 11, 1932, P. J. Bermudez 9 ♂♂, 7 ♀♀. PORTO RICO: San Juan, P. R., July 9-12, 1914, 1 ♀ (A. M. Nat. Hist.)

Rheumatobates minutus Hungerford

Plate VII, fig. 4.

- 1936 *Rheumatobates minutus* Hungerford, H. B., Carnegie Inst. of Washington, publ. no. 457, pp. 147-148 (desc. from Yucatán, Mex.).
 1937 *Rheumatobates minutus* Drake, C. J., and Harris, H. M., Rev. de Entomologia, vol. VII, fasc. 4, p. 362 (reports from "Puerto Rico").
 1942 *Rheumatobates minutus* Drake, C. J., and Harris, H. M., Rev. Brasil Biol., 2(4), pp. 400-401 (report from Panamá and Porto Rico).
 1949 *Rheumatobates minutus* Herring, Jon., Florida Ent., vol. 32, no. 4, p. 160 (compares with his *R. crinitus*).
 1951 *Rheumatobates minutus* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc. Washington, vol. 64, p. 155 (lists Mexico, Panamá, Trinidad, Perú).

Size: Length of apterous male 1.6 mm; of female slightly less than 2.2 mm.

Thus it is the smallest *Rheumatobates* so far described.

Color: Nearly black above; rear margin of head brown; light-brown irregular spot on pronotum; a larger one on mesonotum, which is broader behind, and in the female is broadly bilobate; a triangular light-brown spot on first genital segment of female; ventral side of head and thorax yellow, a dark band on sides of mesothorax extending from behind the eyes to the mesocoxae; abdominal venter of male black, genital segments with a yellow longitudinal band; abdominal venter of female yellow with basal segments darker; antennae and legs black except basal half of first antennal segment and the front femora beneath and at the base above.

Structural characteristics: Male with antennae, middle and hind legs unmodified. Antennal formula of both sexes about the same, being: 1st: 2nd: 3rd: 4th.: 14: 7: 19: 13. The front femora but slightly thickened in the male, with some slender hairs on caudal side but lacking a distinct row of strong spines. The formula for the male front leg segments being: 33: 23: 4: 11. For the female: 35: 20: 4: 12. The venter of thorax flattened to depressed.

Location of types: Holotype and allotype in University of Michigan Zoological Museum and two female paratypes in Francis Huntington Snow Museum of Univ. of Kansas.

Data on distribution: MEXICO: Described from one male and three females from Yucatán, Mex., Mérida, Niagra Cenote, July 21, 1932, E. P. Creaser. PORTO RICO: Mayaguez, Puerto Rico, Aug. 4, 1935, H. D. Tate, 1 winged male sent us by Dr. Drake. PANAMA: Panamá, Feb. 10, 1939, C. J. Drake, 22 specimens, apterous and winged of both sexes. (In Drake coll.)

Rheumatobates minutus flavidus Drake and Harris

1942 *Rheumatobates minutus* var *flavidus* Drake, C. J., and Harris, H. M., Rev. Brasil Biol., 2(4), p. 401 (desc. from Perú).

1951 *Rheumatobates minutus* var *flavidus* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc., Washington, vol. 64, p. 155.

This subspecies has the most striking color pattern of any *Rheumatobates*.

Size: Stated by the authors to be a little larger than typical *R. minutus*. They give the length as 1.8 mm and width as 0.70 mm. The series I have measured vary for the males from 1.596 mm to 1.89 mm in length and for the females from 1.785 mm to 2.2 mm.

Color: The pattern for the apterous form is striking. The head is fulvous to darker with a paler line at base of vertex. The thorax orange to lemon yellow, sometimes with a flavous band laterally and a dark median spot on the caudal half. The genital segments pale. The abdomen black. The winged forms not so distinct from *R. minutus* but usually the front lobe of the pronotum is entirely pale and when it is not, all my specimens lack the dark band that extends from mesocoxa to the pronotum in *R. minutus*.

Structural characteristics: The hairs on the front femora are more conspicuous than in *R. minutus*. Otherwise the same.

Location of types: Haplotype apterous male, allotype female and paratype female, in the Drake and Harris collections.

Data on distribution: Described from "Shapajilla, Huánuco, Peru, Julho 1939." PERU: Type series above.

In the Francis Huntington Snow Museum we have the following: Dept. Huánuco, Loc. Shapajilla, Jungle, 630 m.a.s.l., Aug. 4, 1938, F. Woytkowski, 2 ♂♂, 2 ♀♀, all apterous; Dept. San Martín, Vic. Rioja, Soritor, Jungle, 900 m.a.s.l., Bog in forest, Oct. 19, 1936. F. Woytkowski, No. 3717. 1 ♂, 1 ♀, both winged; Dept. Huánuco, Vic. Leonpampa, Jungle, 800 m.a.s.l., Dec. 11-30, 1937. F. Woytkowski, No. 3811, 1 ♀ winged; Dept. Huánuco, Vic. Tingo Maria. Pond in clearing, 800 m.a.s.l., May 10, 1937. F. Woytkowski, No. 3772, 1 ♀ winged; Vic. Sani Beni, 840 m.a.s.l., Salt pool, 4% salt in jungle, Oct. 26, 1935. F. Woytkowski, No. 3559. 2 ♀♀

apterous. BRAZIL: Brazil, S. A., Vic. João Pessoa (São Phelipe) river Jurua, 7-10, 9-20, 1936. A. M. Olalla, No. 379. 3 ♂♂ (all winged), 9 ♀♀ (5 winged). Same as above except No. 375. 19 ♂♂ (11 winged), 15 ♀♀ (5 winged); *R. Amazonas* (Nrte), Region de Itacoatiara, Jan., Apr., 1936. A. M. Olalla, 1 ♂ (fully winged); R. Madeira, 9-37, Porto Velho, A. M. Olalla, 2 ♂♂, 1 ♀ (all apterous).

This subspecies was not previously known for Brazil.

Rheumatobates creaseri Hungerford

Plate IX, figs. 10, 10a, 10b.

1936 *Rheumatobates creaseri* Hungerford, H. B., Carnegie Inst. of Washington, Publ. no. 457, pp. 146-147, text fig. of ♂ antenna, desc. from Yucatán, Mexico.

1942 *Rheumatobates creaseri* Drake, C. J., and Harris, H. M., Rev. Brasil Biol., 2(4), p. 402.

1951 *Rheumatobates creaseri* Drake, C. J., and Harris, H. M., Proc. Biol. Soc. Washington, vol. 64, p. 150 (completes desc. and compares with *R. citatus* sp. nov. records Acapulco, Mexico).

Size: Length of male 2.55 mm; of female 2.9 mm.

Color: The apterous forms are black. The interocular space dark brown to black. A yellow spot on the pronotum which is quadrate in the male, often nearly round in the female and attains anterior and posterior margins, a small yellow spot above each mesoacetabulum. Ventral side of head, meso- and metasternum and abdominal venter for the most part brown. Prosternum, mesopleuræ, mesoacetabula, metacoxæ and trochanters yellow. Anterior femora mostly pale. Antennæ black, except basal segment in female which is mostly pale and the distal half of the third segment and basal part of fourth segment in the male which is pale yellow.

Structural characteristics: Antennæ of male with basal segment incrassate, slightly longer than the head and provided with stout bristlelike hairs beneath, some of which are fused into a shiny black projection; second segment short, stout and with a basal spinelike hair beneath, third segment flattened, curved and longitudinally excavate beneath, a basal lobate projection beneath, a fringe of hairs on inner margin, distal segment pale at base and somewhat curved and tapering, basal third denticulate beneath; anterior trochanters of male produced beneath; anterior femora no thicker than middle femora and without conspicuous stout hairs. The middle femur rather stout, distinctly bowed, somewhat compressed laterally, sharply incrassate above apically, bifid behind with a broadly flattened hook curved around between the bifid ends; the

tibia slender, straight with a few long hairs near the middle. Hind legs straight.

Location of types: Holotype male, and allotype in University of Michigan Entomological Museum. Female paratypes in Francis Huntington Snow Museum of University of Kansas.

Data on distribution: Described from one male and three females from Yucatán, Mexico. Mérida, Niagra Cenote, July 21, 1932, E. P. Creaser. MEXICO: Yucatán, type series above; Acapulco, Aug. 3, 1951, Drake and Hottes, 6 specimens.

Rheumatobates citatus Drake and Hottes

Plate IX, figs. 11, 11a, 11b

1951 *Rheumatobates citatus* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc. Washington, vol. 64, pp. 150-152; 155. (Desc. from Mexico.)

Size: The authors give the length of apterous male as 2.75 mm. I do not have any apterous specimens of this species but have one male and five females with perfect wings. The over-all length to tip of wings of winged males is 3.67 mm, but the insect's body is only 2.52 mm long. The winged females in over-all length are from 2.94 mm to 3.15 mm, while the body length varies from 2.52 mm to 2.69 mm.

Color: The apterous forms "velvety black with testaceous markings". The winged specimens before me have black heads with a narrow band of fulvous at base of vertex; a transverse pale quadrate spot on pronotum and a round one above the middle acetabulum. Thoracic venter pale with brownish streaks on mesosternum behind front coxae; abdominal venter of male more or less embrowned. The antenna of male fuscous-black with the underside of first segment largely brownish testaceous, the apical third of the third and basal two thirds of fourth whitish testaceous; in the female, basal half of first antennal segment pale, otherwise dark.

Structural characteristics: The male antennae and middle and hind legs are distinctive and show close relationship with *R. creaseri* Hungerford. The first antennal segment is longer and less incrassate than in latter species. The second segment has a small bump beneath at the base, beneath which arises a tuft of fused long hairs, (see Plate IX, fig. 11a.); the distal segment shorter than in *R. creaseri*. The describers give the antennal formula for male: 1st: 2nd: 3rd: 4th:: 55: 13: 27: 17, for the female 11: 6: 12: 13. In the females I have measured there is little difference in the length of third and fourth segments. The front femur of the male is not in-

crassate, a little wider than the middle section of middle femur and provided on its caudolateral margin with a row of about six spines that are not as long as the diameter of the femur.

The middle femur is as shown on Plate IX, figs. 11, and 11b. The hind femur is decidedly longer than in *R. creaseri* and the hind tibiae are curved instead of straight.

Location of types: In the collection of the authors.

Data on distribution: MEXICO: The holotype, allotype and three male paratypes taken in the quiet waters of a small stream, about 20 miles south of Tehautepec, Mex., July 23, 1951 by the authors. One paratype, Acapulco, Mex., Aug. 3, 1951, also taken by the authors.

We have in the Francis Huntington Snow Museum the following: Mexico, Dec. 7, 1932, A. Dampf, Mapastepec Chis. (Chiapas) Pacific Coast plain. At light. 1 ♂, 4 ♀ ♀ all with perfect wings: Another female taken at Tonalá, Chis., Nov. 3, 1932 by A. Dampf, at light.

Rheumatobates praeposterus Bergroth

Plate X, fig. 12

1908 *Rheumatobates praeposterus* Bergroth, E., Ohio Nat., vol. 8, pp. 376-380, 382, figs. 4, 5 (desc. from Guatemala).

1909 *Rheumatobates praeposterus* Kirkaldy, G. W., and Torre-Bueno, J. R. de la, Catalogue in Proc. Ent. Soc. Washington, vol. 10, p. 212.

1931 *Rheumatobates praeposterus* Schroeder, Herman O., Kansas Univ. Sci. Bull., vol. 20, No. 2, pp. 66 and 73-74.

1942 *Rheumatobates praeposterus* Drake, C. J., and Harris, H. M., Rev. Brasil Biol., 2(4), p. 402.

1951 *Rheumatobates praeposterus* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc. Washington, vol. 64, p. 155.

Size: The apterous male length 2.02 mm. to 2.2 mm.; width across the head .84 mm. The apterous female length 2.56 mm.-2.9 mm.; width across the head .76 mm. to .798 mm.

Color: Brown to black, a quadrate pale spot on pronotum and a small round spot above the middle acetabula. Dorsum of abdomen frosted. First genital of female with or without a pale spot. Head brown beneath prosternum pale; mesosternum and abdominal venter brown.

Structural characteristics: The splendid description by Bergroth and the illustration given on Plate X will identify this species.

Location of types: Unknown to me. They are not in the Hine Collection at Ohio State.

Data on distribution: GUATEMALA, C. A.: This species was de-

scribed from four males, numerous females and some larvae from Puerto Barrios taken by Professor James S. Hine. We have received via the Kirkaldy collection 1 ♂, 2 ♀ ♀ from the cotype series. These are now in the Francis Huntington Snow Museum, University of Kansas.

Rheumatobates tenuipes Meinert

Plate X, figs. 15, 15a

- 1898 *Rheumatobates rileyi* Riley, C. V., Insect Life, vol. 5, p. 190, fig. 18, as "normal male" of *R. rileyi* Bergroth.
- 1895 *Rheumatobates tenuipes* Meinert, Fr., Entomologiske Meddelelser, vol. 5, pp. 1-8.
- 1908 *Rheumatobates tenuipes* Bergroth, E., Ohio Naturalist, vol. 7, p. 377, fig. 3, antenna; p. 381.
- 1909 *Rheumatobates tenuipes* Kirkaldy, G. W., and Torre-Bueno, J. R. de la, Catalogue in Proc. Ent. Soc., Washington, vol. 10, p. 212.
- 1911 *Rheumatobates tenuipes* Torre-Bueno, J. R. de la, Trans. Amer. Ent. Soc., vol. 37, No. 3, p. 250.
- 1915 *Rheumatobates tenuipes* Bergroth, E., Bull. Brooklyn Ent. Soc., vol. 10, pp. 63-64 (records Bainbridge, Ga., in society with his new *R. trulliger*).
- 1916 *Rheumatobates tenuipes* Van Duzee, E. P., Check List of the Hemiptera, p. 49.
- 1917 *Rheumatobates tenuipes* Van Duzee, E. P., Catalogue of the Hemiptera of America North of Mexico, Univ. Calif. Publ. Tech. Bull. Entomology, vol. 2, p. 43.
- 1920 *Rheumatobates tenuipes* Hungerford, H. B., Kansas Univ. Sci. Bull., vol. 11, p. 116.
- 1920 *Rheumatobates tenuipes* Parshley, H. M., Psyche, vol. 19, p. 143.
- 1923 *Rheumatobates tenuipes* Torre-Bueno, J. R. de la, Univ. Iowa Studies in Nat. Hist., vol. 10, no. 3, p. 35.
- 1923 *Rheumatobates tenuipes* Wiley, Grace Olive, Can. Ent., vol. 55, p. 202 (comp. note).
- 1923 *Rheumatobates tenuipes* Torre-Bueno, J. R. de la, Connecticut Geol. and Nat. Hist. Surv. Bull., vol. 34, p. 663 (should be found in Conn.).
- 1926 *Rheumatobates tenuipes* Blatchley, W. S., The Hemiptera of Eastern North America, p. 982, fig. 196 on page 983, p. 984 (adds Glenn Echo, Md., and Raleigh, N. C., to D. C. record).
- 1926 *Rheumatobates tenuipes* Esaki, T., Annales Musei Nationalis Hungarici, vol. 23, p. 149 (says types are in Copenhagen Zool. Mus.).
- 1928 *Rheumatobates tenuipes* Drake, C. J., and Harris, H. M., Ohio Journ. Sci., vol. 28, no. 5, p. 273 (lists Md., Miss., Fla., and Tenn.).
- 1931 *Rheumatobates tenuipes* Schroeder, Herman O., Univ. Kans. Sci. Bull., vol. 20, no. 2, p. 66, p. 68-69 (a co-type in Snow Coll. K. U.).
- 1936 *Rheumatobates tenuipes* Hungerford, H. B., Carnegie Inst. of Washington, Pub. no. 457, p. 148 (in key).
- 1942 *Rheumatobates tenuipes* Drake, C. J., and Harris, H. M., Rev. Brasil Biol., 2(4), p. 4-2.
- 1950 *Rheumatobates tenuipes* Herring, Jon L., Florida Ent., vol. 33, no. 1, p. 31-32 (records 5 counties in Fla. and says eggs inserted in stems and leaves of aquatic plants).
- 1951 *Rheumatobates tenuipes* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc. Washington, vol. 64, p. 155 (lists).

Size: Apterous males, length 2.44 mm to 2.86 mm; over all length of winged male 3.86 mm. Apterous females, length 2.94 mm to 3.28 mm.

Color: Varies from specimens with a broad pale median longitudinal spot on the mesonotum in apterous forms to others that have the mesonotum entirely black. The mesosternum yellow with the anterior margin and two posteriorly diverging bands brownish black, these bands not reaching the posterior margin, dilated near the anterior margin. These bands will usually separate the females from those of *R. rileyi* which do not have these pronounced bands.

Structural characteristics: The males have antennae modified much as they are in *R. rileyi*, *R. trulliger* and *R. hungerfordi* but the hind femora are straight, not modified as in these species. The hairs on the middle femur are longer than in *R. rileyi*. The female antennal formula is: 1st: 2nd: 3rd: 4th.: 19: 9: 24: 25.

Location of types: Esaki says types are in Copenhagen Zool. Mus. Specimens some of them cotypes from the O. Heidemann collection were sent to Dr. Kirkaldy, and the following are now in the Francis Huntington Snow Museum at the University of Kansas: Washington, D. C. 9 VIII, '93, 2 ♀ ♀; Glen Echo, Md. 26 July 1894, 1 ♂ winged; Glen Echo, Md. 13 June 1897, 1 ♀; Glen Echo, Md. 27 July, '93 1 ♂; Glen Echo, 28 Sept. 1893, 1 ♂; Potomac Canal, Glen Echo, Md. 3-10-'92, 2 ♂ ♂, 1 ♀.

Data on distribution: MARYLAND and DISTRICT OF COLUMBIA: The type series. GEORGIA: Reported by Bergroth. NORTH CAROLINA: Reported by Blatchley. MISSISSIPPI: Reported by Drake and Harris. TENNESSEE: Reported by Drake and Harris. FLORIDA: Reported by Drake and Harris. I can add from the Francis Huntington Snow Museum the following: NORTH CAROLINA: Beaufort 7-9-'34. A. S. Pearse, 1 ♂, 3 ♀ ♀. VIRGINIA: New Church, 7-14-'33. L. D. Anderson, 2 ♂ ♂, 2 ♀ ♀; Lake Drummond, 9-10-'33. L. D. Anderson, 1 ♂, 1 ♀. FLORIDA: Lake Jovita, 7-20-'34. P. McKinstry, 9 ♂ ♂, 16 ♀ ♀; Apalachicola, 6-15-'35. A. S. Pearse, 4 ♂ ♂, 6 ♀ ♀; Plant City, 8-15-'30. Paul W. Oman, 15 ♂ ♂, 33 ♀ ♀ (many nymphs.)

Rheumatobates carvalhoi Drake and Harris

Plate IX, figs. 9 and 9a.

1944 *Rheumatobates carvalhoi* Drake, C. J., and Harris, H. M., Rev. de Entomologia, vol. 15, fasc. 3, pp. 269-272, 1 fig. (desc. from Brazil).

1951 *Rheumatobates carvalhoi* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc. Washington, vol. 64, p. 154.

Size: Length of apterous forms 2.9 mm to 3.0 mm.

Color: General color brownish black, with flavous and brownish markings, densely shortly pubescent. Head, except in front and

broad median dark fuscous stripe, yellowish brown; pronotum with large median quadrate area flavous, the sides brownish black; mesonotum brownish black; metanotum and abdomen brownish black without conspicuous markings. Head beneath, sternum, coxae and trochanters pale testaceous. Front femur testaceous, tibia brownish, tarsus blackish. Middle and hind legs brownish black.

Structural characteristics: The figure submitted by the authors and copied by me should identify this species. They give the antennal formula for the male: 1st: 2nd: 3rd: 4th.: 34: 5: 27: 23, and for the female: 20: 5: 24: 20. The male has stout front legs, the femora of which are somewhat compressed laterally, beneath with very long, brown, setalike hairs, above with a prominent tubercle a little beyond base. The other legs as shown on Plate IX. The abdomen beneath concave, the margins of the segments beset with extremely long brownish hairs, each tuft of hairs strongly curved downward and inward, their tips nearly touching. The genital segments slender, narrowed posteriorly, arched downward, the terminal segment shorter, the first segment beneath with raised margins.

Location of types: In collection of the authors.

Data on distribution: BRASIL: Carmo, R. Claro, Minas Gerais, Brasil, June 15, 1943, Dr. José Carvalho. Described from holotype male, allotype female, three paratypes, and known only from the above.

Rheumatobates mexicanus Drake and Hottes

Plate XI, figs. 16, 16a; Plate XIV, fig. 27.

1951 *Rheumatobates mexicanus* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc. Washington, vol. 64, pp. 152-155 (desc. from Mexico).

Size: Length of apterous male 2.18 mm to 2.52 mm. Over-all length of winged male 3.15 mm. Length of apterous female 2.73 mm to 2.86 mm. Over-all length of winged female 3.03 mm.

Color: Apterous forms variable, black with more or less prominent testaceous markings. Head black with base of vertex flavous. Pronotum with pale spot often covering most of the dorsum. Mesonotum may have large diamond-shaped spot, none at all, a slender pale line, or a broad one. Abdominal dorsum black. The connexivum and genital segments may be pale or dark. Venter testaceous.

Structural characteristics: The authors give the antennal formulae as follows: For the male. 1st: 2nd: 3rd: 4th.: 45: 10: 28: 14. For the female 20: 9: 20: 25. The male antennae and hind legs are

modified. The male antenna with first segment moderately swollen, becoming thicker beneath from base for about two fifths its length, then thickest near the basal third, beneath with some long dark hairs, several of which are fused so as to form a long stout spine-like structure which is directed antero-downwards, becoming slender and almost cylindrical anteriorly, broadly constricted before the apex; segment two very short, at the base beneath with the fused hairs pointed downward; segment three moderately long, with some long dark stiff hairs beneath, strongly abruptly bent outwards near the base, on the lower side at the base with several long hairs fused so as to form an extremely long spinelike process, with a small bump before the apex on the outside, beneath near the apex with some long hairs fused, distinctly concave between bump and elbow on the outer surface; segment four rather short, concave and flattened beneath with apical part turned downwards, and with a couple bristly hairs.

The hind legs of male have "the hind coxae long, very strongly swollen thickest near the base, thence arcuately narrowed apically, clothed with very short pubescence, longer than the trochanters; trochanters moderately thick, with a few fine hairs beneath; femora rather short, very strongly bowed within, somewhat rounded basally, thence flattened and sort of scooped out on concave surface of apical fourth, clothed with numerous short hairs on entire dorsal surface, beneath just in front of small knob at base with long hairs fused so as to form a long dark spinelike process, another extremely long spinelike process a little before the apex, near the upper edge about the middle with a peculiarly modified flattened hairlike formation." The above description by the authors is difficult to visualize but my illustration on Plate XIV will show the slender stemmed anchorlike or T-shaped structure on the inner side of the hind femur.

Location of types: In the authors' collections.

Data on distribution: MEXICO: Acapulco, Mex., Aug. 3, 1951, Drake and Hottes. Type male, allotype female both apterous taken in a salt-water lagoon. Many other specimens apterous, macrop-terous and deälated males and females taken with the types.

The authors also took specimens in Aguascalientes, Puebla, Oaxaca, Tehautepec, Mexico City, Ciudad Valles, Cuidad Victoria, Alvarado and Veracruz. They found them on fresh water as well as on brackish salt-water lagoons connected with the ocean. Dr. Drake kindly sent 6 male and 3 female paratypes to the Francis Huntington Snow Entomological Museum.

Rheumatobates hungerfordi Wiley

Plate X, fig. 13.

- 1923 *Rheumatobates hungerfordi* Wiley, Grace Olive, Can. Ent., vol. 55, p. 202-205, pl. X (desc. from Texas and compares with *R. rileyi* Bergroth and *R. tenuipes* Meinert).
- 1928 *Rheumatobates hungerfordi* Drake, C. J., and Harris, H. M., Ohio Journ. Sci., vol. 28, no. 5, p. 274 (records Texas).
- 1931 *Rheumatobates hungerfordi* Schroeder, Herman O., Kansas Univ. Sci. Bull., vol. 20, no. 2, pp. 72-73, Pl. XI, figs. 3-4 (records Texas and Utah).
- 1937 *Rheumatobates hungerfordi* Drake, C. J., and Harris, H. M., Rev. de Entomologica, vol. 7, fasc. 4, p. 362 (records Texas, Utah, N. M.).
- 1939 *Rheumatobates hungerfordi* Millspaugh, Dick D., Field and Laboratory, vol. 7, No. 2, p. 75 (probably over winter as eggs in Texas).
- 1942 *Rheumatobates hungerfordi* Drake, C. J., and Harris, H. M., Rev. Brasil Biol., 2(4), p. 402 (adds Ariz. and Mexico).
- 1951 *Rheumatobates hungerfordi* Drake, C. J., and Harris, H. M., Proc. Biol. Soc. Washington, vol. 64, pp. 149-150 (lists four places in Mexico).
- 1952 *Rheumatobates hungerfordi* Ellis, Leslie L., American Midland Nat., vol. 48, no. 2, pp. 323-324 (collected in Louisiana).

Size: Length apterous male 2.6 mm to 2.94 mm; of apterous female 2.73 mm to 3.25 mm; of winged male 3.78 mm to 3.86 mm; of winged female 3.44 mm to 3.57 mm.

Color: Velvety black, covered with a bluish-white bloom. Head black, sometimes with a flavous band at base of vertex. Pronotum with a large yellow spot occupying the entire length, in some specimens quadrate, in others twice as wide as long with sides rounded, while in some the spot covers the entire disk of the pronotum; mesonotum with a large median yellow spot, almost quadrate, or diamond-shaped in some specimens while in others it is roughly the shape of an inverted heart; a small spot above the mesoacetabula. In the winged forms only the yellow pronotal spot is visible. The basal half of the hemelytra are white with brown veins. The distal half embrowned. The transverse fracture line is white and from its middle a white line leads to the wing tip. Thoracic venter yellow with a brown band on mesosternum behind each front coxa, often the mesosternum is almost entirely dark. The abdominal venter in both sexes usually brown.

Structural characteristics: The female antennal formula is: 1st: 2nd: 3rd: 4th.: 20: 8: 20: 24. The male antennae and hind legs are modified as shown in the drawings. Mrs. Wiley has given a good detailed description of the species.

Location of types: The holotype, allotype, and morphotypes in Mrs. Wiley's collection. Paratypes in the collections of the University of Minnesota, University of Kansas, and the private collections of Wm. E. Hoffmann and Mrs. Wiley.

Data on distribution: TEXAS: Rock Island, Texas, Aug. 2, 1922. Grace O. Wiley. Apterous male Holotype. Rock Island, Texas, June 27, 1922. Grace O. Wiley. Apterous female Allotype. Morphotype male (macropterous form) June 6, 1922 at type locality. Morphotype female (macropterous form) May 23, 1922 at type locality. Various paratypes taken from April to September at above place. Others from Galveston and Cisco, Texas.

We have in the Francis Huntington Snow Museum at the University of Kansas from Texas the following: Paratypes from Rock Island, Texas, 1 ♂ 1 ♀; paratypes from Colorado Co., Texas, 2 ♂ ♂, 2 ♀ ♀. Colorado Co., Texas, 5/5/1922. Grace Olive Wiley, 2 ♂ ♂ (1 winged) 1 ♀ (winged). Colorado Co., Texas, July 11, 1922. Grace Olive Wiley, 8 ♂ ♂, 5 ♀ ♀ (all apterous). Colorado Co., Texas, 5/8/1922. Grace Olive Wiley 3 ♂ ♂ (all winged) Colorado Co., Texas, 4/24/1922. Grace Olive Wiley, 4 ♀ ♀ (all winged). Kerr Co., Texas, 7/21/1928. L. D. Beamer, 14 ♂ ♂ (5 winged). Menard Co., Texas, 7/19/28. R. H. Beamer, 7 ♂ ♂, 1 ♀ (all apterous). Tom Green Co., Texas, 7/15/28. R. H. Beamer, 1 ♂ (winged, 2 ♀ ♀ (apterous). Hidalgo Co., Texas, 7/28/28. A. M. James, 1 ♀ (apterous). Kendall Co., Texas, 7/22/28. J. G. Shaw, 9 ♂ ♂ (1 winged). McAllen, Texas, 11/20/32. L. D. Tuthill, 5 ♂ ♂ (1 winged) 6 ♀ ♀ (1 winged).

ARKANSAS: Polk Co. Ark., 8/21/28. R. H. Beamer 2 ♀ ♀ (apterous). OKLAHOMA: Ketchum Okla., 10/11/32. L. D. Tuthill, 1 ♂ (apterous). UTAH: Emery Co., Utah, Aug. 2, 1922. Mrs. Grace Wiley, 1 ♂ (winged), 5 ♀ ♀ (4 winged). MEXICO: Valles, Mex., Aug. 8, 1951. C. J. Drake, 1 ♀; July 17, 1950, Drake and Hottes, 1 ♂ (apterous). Piedras Negras, Ver Costal Plain, Mex., 10/18/26. Dr. Dampf, 4 ♀ ♀ (winged).

Rheumatobates trulliger Bergroth

Plate X, Fig. 14

- 1915 *Rheumatobates trulliger* Bergroth, E., Bull. Brooklyn Ent. Soc., vol. X, pp. 63-73 (desc. from Bainbridge, Ga., in society with *R. tenuipes*).
- 1917 *Rheumatobates trulliger* Van Duzee, E. P., Catalogue of the Hemiptera of America North of Mexico, Univ. of Calif. Publ. Tech. Bull. Ent., vol. 2, p. 431.
- 1920 *Rheumatobates trulliger* Hungerford, H. B., Kansas Univ. Sci. Bull., vol. 11, p. 116 (footnote).
- 1926 *Rheumatobates trulliger* Blatchley, W. S., Heteroptera of Eastern North America, pp. 984-985.
- 1928 *Rheumatobates trulliger* Drake, C. J., and Harris, H. M., Ohio Journ. Sci., vol. 28, no. 5, p. 274 (records Tenn. and Miss.).
- 1931 *Rheumatobates trulliger* Schroeder, Herman O., Kansas Univ. Sci. Bull., vol. 20, no. 2, p. 72, pl. VI, fig. 3, p. 85, pl. XI, figs. 5-6 (records Kansas and Arkansas).

1942 *Rheumatobates trulliger* Drake, C. J., and Harris, H. M., Rev. Brasil Biol., 2(4), p. 402 (lists).

1951 *Rheumatobates trulliger* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc., Washington, vol. 64, p. 155 (lists).

Size: Length of apterous male 2.5 mm. to 2.8 mm. Over all length of winged male about 3.36 mm. Length of apterous female 2.73 mm. to 3.15 mm.

Color: The pattern much the same as in *R. rileyi* Bergroth and subject to considerable variation. The head is black, with or without a fulvous line at base of vertex. The pale spot on the pronotum may be narrow, nearly square reaching both front and rear margins or it may be broad covering most of the pronotum. In the apterous forms the pale spot may be broadly heart-shaped, triangular, diamond-shaped, arrow-shaped, a slender line, or absent entirely. The connexivum may be black, margined with yellow, or entirely yellow. A pale spot may be present on first genital of female or absent. The underside of thorax is usually pale with a brown band behind each anterior coxa. The abdominal venter embrowned at least along the sides in the female, and brown to black in the male.

Structural characteristics: Males with antennae and hind legs modified. The first antennal segment more incrassate than in *R. rileyi*. The antennal formula for the female: 1st: 2nd: 3rd: 4th:: 19: 9: 25: 23. In the male the middle femur is straight, hairless from the base to near the apex where there are a few hairs on inner margin. Middle tibia fringed with long straight hairs on the inner side from base to beyond the middle, then with short straight hairs.

The curved hind femur without long hairs along the inner margin, but with three tufts near the distal end. The hind tibia with a smooth shining depressed area surrounded by hairs as shown in Plate X.

Location of types: Not stated in original description.

Data on distribution: GEORGIA: The type series taken by J. C. Bradley from Bainbridge, Georgia. TENNESSEE: Knoxville, June 15, 1890. H. E. Summers, reported 1928 by Drake and Harris. MISSISSIPPI: Charleston, Sept. 7, 1925, H. M. Harris. Shipman, Aug. 2, 1921, C. J. Drake.

The above records reported 1928 by Drake and Harris.

We have in the Francis Huntington Snow Museum the following: KANSAS: Cherokee Co., Kans., Aug. 1920. Hungerford and Beamer, 4 ♂♂. 1 ♀ (all apterous). OKLAHOMA: Ottawa Co.,

Okla., Cowskin River 9/26/32. L. D. Tuthill, 4 ♂♂ (all apterous). Fairland, Okla., 9/24/32. L. D. Tuthill, 79 ♂♂, 51 ♀♀ (all apterous) and many nymphs. ARKANSAS: Polk Co., Ark., 8/21/28. R. H. Beamer, 10 ♂♂ (1 winged), 3 ♀♀.

Rheumatobates rileyi Bergroth

Plate XI, fig. 18, Plate XIV, fig. 28.

- 1891 *Hemipterous larva* Zabriskie, J. L., Jl. N. Y. Microscopical Soc., vol. 7, pp. 128-129 (figured and described an unknown water bug).
 1892 *An aquatic Bug* Riley, C. V., Insect Life, vol. IV, pp. 198-200 (refigured and redescribed above under "An Interesting Aquatic Bug").
 1892 *Rheumatobates rileyi* Bergroth, E., Insect Life, vol. 4, p. 321 (named above *Rheumatobates rileyi*).
 1893 *Rheumatobates rileyi* Riley, C. V., Insect Life, vol. 5, p. 190 (in part) (reports taken by Heidemann from Potomac Canal near Washington).
 1895 *Rheumatobates rileyi* Meinert, Fr., Entomologiske Meddelelser, vol. 5, pp. 1-8.
 1905 *Rheumatobates rileyi* Torre-Bueno, J. R. de la, Journ. N. Y. Ent. Soc., vol. 13, p. 41 (Echo L., Westfield, N. J., Cranford, N. J.).
 1908 *Rheumatobates rileyi* Torre-Bueno, J. R. de la, Journ. N. Y. Ent. Soc., vol. 16, p. 234 (White Plains, N. Y.).
 1908 *Rheumatobates rileyi* Bergroth, E., Ohio Nat., vol. 8, p. 381 (records Glen Echo, Md.).
 1908 *Rheumatobates rileyi* Torre-Bueno, J. R. de la, Ohio Nat., vol. 9, p. 390.
 1909 *Rheumatobates rileyi* Kirkaldy, G. W., and Torre-Bueno, J. R. de la, Catalogue in Proc. Ent. Soc., Washington, vol. 10, p. 212.
 1910 *Rheumatobates rileyi* Smith, John B., Catalogue of Insects found in New Jersey, 3rd ed., p. 152.
 1911 *Rheumatobates rileyi* Torre-Bueno, J. R. de la, Trans. Amer. Ent. Soc., vol. 37, p. 250.
 1911 *Rheumatobates rileyi* Torre-Bueno, J. R. de la, Can. Ent., vol. 43, p. 228 (says: *Halobatopsis beginii* Ashm. 1897 is, in part, a synonym).
 1912 *Rheumatobates rileyi* Torre-Bueno, J. R. de la, Can. Ent., vol. 44, p. 212 (Yaphank, N. Y.).
 1916 *Rheumatobates rileyi* Van Duzee, E. P., Check list of the Hemiptera, p. 49.
 1917 *Rheumatobates rileyi* Van Duzee, E. P., Catalogue of the Hemiptera of America North of Mexico, p. 431.
 1919 *Rheumatobates rileyi* Hussey, R. F., Water Bugs of Douglas Lake Region in Occas. Papers Museum Zool. Univ. of Michigan, no. 75, p. 12 (applies to *R. rileyi palosi* Blatchley).
 1920 *Rheumatobates rileyi* Hungerford, H. B., Kansas Univ. Sci. Bull., vol. 11, p. 115 and p. 120 (found in muddy ponds in Kansas and applies to *R. r. palosi* Blatchley).
 1920 *Rheumatobates rileyi* Parshley, H. M., Bull. Brooklyn Ent. Soc., vol. 15, pp. 67-70 (reports Mass. as record and says Bueno's citation of *Halobatopsis beginii* Ashmead as synonym not justified).
 1920 *Rheumatobates rileyi* Parshley, H. M., Psyche, vol. 27, p. 143 (reports southern Vermont on quiet pond and says color variation is great, some Vermont specimens being dark like Hussey's Michigan specimens).
 1922 *Rheumatobates rileyi* Parshley, H. M., Can. Ent., vol. 53, p. 239.
 1922 *Rheumatobates rileyi* Parshley, H. M., Bull. Brooklyn Ent. Soc., vol. 17, pp. 136-137 (note on migration).
 1922 *Rheumatobates rileyi* Osborn, Herbert, and Drake, Carl J., Tech. Publ., no. 16 of New York State College of Forestry at Syracuse U., p. 82.
 1923 *Rheumatobates rileyi* Torre-Bueno, J. R. de la, Connecticut Geol. and Nat. Hist. Survey Bull., 34, p. 663.

- 1923 *Rheumatobates rileyi* Wiley, Grace Olive, Can. Ent., vol. 55, p. 202, fig. 7 (comp. note).
- 1925 *Rheumatobates rileyi* Hungerford, H. B., and Beamer, R. H., Ent. News, vol. 36, p. 264 (applies to *R. r. palosi*).
- 1926 *Rheumatobates rileyi* Blatchley, W. S., Heteroptera of Eastern North America, pp. 982-983 (lists Brooklyn, N. Y., Cranford, N. J., and Raleigh, N. C., but his figure 196 is *R. tenuipes* Meinert not *R. rileyi*). He also describes *R. rileyi palosi* var. nov. from Marion Co., Ind., and Palos Park, Ill.
- 1926 *Rheumatobates rileyi* Esaki, T., Annales Musei Nationalis Hungarici, vol. 23, pp. 148-149.
- 1928 *Rheumatobates rileyi* Torre-Bueno, J. R. de la, in "A List of the Insects of New York," p. 136, Cornell Univ. Agri. Exp. Sta. Memoir 101.
- 1928 *Rheumatobates rileyi* Drake, C. J., and Harris, H. M., Ohio Journ. Sci., vol. 28, no. 5, p. 274 (lists Miss., Fla., Ohio, Iowa, Ill.).
- 1931 *Rheumatobates rileyi* Silvey, J. K., Gwynn Pap. Michigan Acad. Sci. Arts and Letters, vol. 13, pp. 433-446 (life history refers to *R. r. palosi* Blatch.).
- 1931 *Rheumatobates rileyi* Schroeder, Herman O., Kansas Univ. Sci. Bull., vol. 20, p. 67 (says dist. limited, Atlantic Coast to D. C.).
- 1936 *Rheumatobates rileyi* Deay, Howard O., and Gould, George E., America Midland Naturalist, vol. 17, No. 4, p. 765.
- 1938 *Rheumatobates rileyi* Beier, Max, Handbuck der Zoologie, vol. 4, p. 2058, fig. 2246.
- 1942 *Rheumatobates rileyi* Drake, C. J., and Harris, H. M., Rev. Brasil Biol., 2(4), p. 402.
- 1950 *Rheumatobates rileyi* Moore, A. G., Contrib. de l'Inst. de Biol. Univ. Montreal, no. 26, p. 25.
- 1950 *Rheumatobates rileyi* Herring, Jon L., Florida Ent., vol. 33, no. 1, p. 31 (records Alachua and Dixie Cos. Florida).
- 1951 *Rheumatobates rileyi* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc., Washington, vol. 64, p. 155 (report that occurs with var. *palosi* Blatch.). If true the latter is a good species.

Size: Length apterous male 2.2 mm to 2.5 mm. Winged male 3.7 mm; apterous female 2.64 mm to 3.15 mm; winged female 3.65 mm.

Color: Schroeder 1931 called attention to the variation in color patterns encountered within a species of *Rheumatobates*. This species is quite variable. The size of the pale pronotal spot varies from a small quadrangle spot to a broad band. The pale mesonotal spot on the apterous forms may be diamond-shaped and broader than long or it may be entirely lacking as it is in all but one specimen in a series of nine from Quebec, Canada. There is a pale spot above the mesoacetabula in both winged and apterous.

The mesosternum pale, sometimes the anterior margin brown.

Structural characteristics: The males with both antennae and hind legs modified. The spur on the terminal antennal segment at or beyond the middle. The antennal formula for the female: 1st: 2nd: 3rd: 4th:: 17: 64: 22: 19. The hind femur of male slightly stouter and hind tibia shorter than in *R. rileyi palosi*. The hind tibia with a slightly raised spot covered with a dense cluster of hairs that is lacking in *R. rileyi palosi*.

Location of types: Since this species was named as a new genus and species by Bergroth by indication and reference to Riley's description and figure of 1892 and Riley's work was based upon a slide furnished him by Reverend Zabriskie, this slide should be found and labeled the "type." I understand that Zabriskie's collections are at the American Museum of Natural History. Whether Riley ever returned the slide to Zabriskie I do not know.

If it cannot be found then a male from the Heidemann material taken at Potomac Canal near Washington could be designated taking care to choose *R. rileyi* not *R. tenuipes*.

Data on distribution: NEW YORK: Flatbush, Long Island, described without name. We have in our collection: Ithaca, N. Y., July 27, 1894, 1 ♂, 2 ♀ ♀ (apterous). DISTRICT OF COLUMBIA: Potomac Canal near Washington taken by Heidemann. MARYLAND: Glen Echo reported by Bergroth, 1908. We have in our Kirkaldy collection the following from this same series: Glen Echo, Md., 2/10/92. O. Heidemann Collector, ♂ and ♀ (apterous); 3/10/92. O. Heidemann collector, 1 ♀ and 1 nymph; 28/7/93, O. Heidemann Collector, 1 ♂ (apterous); 7/8/93. O. Heidemann Collector, 5 ♂, 1 ♀ (apterous); 9/8/93. O. Heidemann Collector, 1 ♂ (apterous); 16/7/94. O. Heidemann Collector, 1 ♀ (winged).

We also have the following: S. riv. 4 miles S. Annapolis, Md., 7/31/32. P. W. Oman, 6 ♂ ♂, 15 ♀ ♀ (apterous); Annapolis, Md., 8/14/32. Oman and Anderson, 5 ♂ ♂, 4 ♀ ♀ (apterous), 10 nymphs (all on salt or brackish water). NEW JERSEY: Echo L. Westfield, N. J., 2, IX, .04, reported by Bueno, 1905, 5 ♂ ♂, 5 ♀ ♀ (Bueno Coll. at K. U.). Cranford, N. J., reported by Bueno, 1905. Rahway R. Cranford, 20, VIII, 04, N. J., reported by Bueno, 1905, 1 ♂, 4 ♀ ♀ (Bueno Coll. at K. U.). VERMONT: Reported by Parshley, 1920. NORTH CAROLINA: Report from Raleigh, N. C. by Blatchley, 1926. OHIO: Reported by Drake and Harris, 1928. INDIANA: Decatur and Ripley Cos., reported by Deay and Gould, 1936. ILLINOIS: Reported by Drake and Harris, 1928. IOWA: Reported by Drake and Harris, 1928. TENNESSEE: We have in the Francis Huntington Snow Museum the following new state records: Coal Creek, Tenn., 8/27/30. Paul W. Oman, 14 ♂ ♂, 22 ♀ ♀ (apterous); Coal Creek, Tenn., 8/27/30. J. Nottingham, 3 ♂ ♂, 12 ♀ ♀ (apterous); Clarksville, Tenn., July 15, 1939. E. G. Wegenek, 1 ♂, 5 ♀ ♀ (apterous.) MISSISSIPPI: Reported by Drake and Harris, 1928. GEORGIA: The Francis Huntington Snow Museum contains the following new state record: Macon, Georgia, 7/25/30. Paul W. Oman,

1 ♂, 3 ♀ ♀ (apterous and many nymphs). FLORIDA: Reported by Drake and Harris, 1928, also by Herring, 1950. CANADA: Quebec, Can., Beattie Lake, 8/6/49. Jas. Blain, 3 ♂ ♂, 3 ♀ ♀ (apterous); Quebec, Can., Beattie Lake, 8/5/49. Howard Loeb, 3 ♀ ♀ (apterous). This appears to be a new record for Canada.

Rheumatobates rileyi palosi Blatchley

Plate XI, fig. 19; Plate XIV, fig. 29

- 1919 *Rheumatobates rileyi* Hussey, R. F., Water Bugs of Douglas Lake Region, Occas. Papers Mus. Zool., Univ. of Mich., no. 75, p. 12.
 1920 *Rheumatobates rileyi* Hungerford, H. B., Kansas Univ. Sci. Bull., vol. XI, p. 115.
 1925 *Rheumatobates rileyi* Hungerford, H. B., and Beamer, R. H., Ent. News, vol. 36, p. 264.
 1926 *Rheumatobates rileyi palosi* Blatchley, W. S., Heteroptera or True Bugs of Eastern North America, p. 982 and 984 (desc. from Marion Co., Ind., and Palos Park, Ill.).
 1931 *Rheumatobates rileyi* Silvey, J. K. Gwynn, Pap. Michigan Acad. Sci., Arts and Letters, vol. 13, pp. 433-446 (life history).
 1931 *Rheumatobates rileyi palosi* Schroeder, Herman O., Kansas Univ. Sci. Bull., vol. 20, no. 2, p. 68 and 85, Pl. XI, figs. 1 and 2.
 1936 *Rheumatobates rileyi palosi* Deay, Howard O., and Gould, George E., Amer. Midland Nat., vol. 18, no. 4, p. 762, figs. 2 and 16 (records 14 counties but not Decatur and Riply Counties in which they took *R. rileyi rileyi* Bergroth).
 1942 *Rheumatobates rileyi palosi* Drake, C. J., and Harris, H. M., Rev. Brasil Biol., 2(4), p. 402.
 1951 *Rheumatobates rileyi palosi* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc., Washington, vol. 64, p. 155 (lists as with typical form).

Size: Length apterous male 2.27 mm to 2.94 mm, a winged male from Kansas 3.57 mm; of apterous female 2.64 mm to 3.36 mm; have no females with unbroken wings. The subspecies averages a little larger than *R. rileyi rileyi*.

Color: Variable. I have not seen a specimen from Cheboygan Co., Mich., showing more than a trace of a pale spot on mesonotum, yet in the series from Rochester, Minn. some have a fair-sized spot, some have none. From Reel Foot Lake, Tenn. most specimens lack the spot as do those from Hilliard, Florida. Material from Kansas and Arkansas usually have a large spot but a few lack it entirely.

Structural characteristics: The males with both antennae and hind legs modified. The spur on the terminal antennal segment before the middle. The antennal formula for the female: 1st: 2nd: 3rd: 4th:: 18: 8: 25: 24. The hind femur more slender and hind tibia of male longer than in *R. rileyi rileyi*.

Location of type: In the Blatchley Collection at Indiana State College, Purdue, Indiana.

Data on distribution: described from Marion Co., Indiana and

Palos Park, Ill. INDIANA: Reported by Deay and Gould from 14 counties. We have: Kosciusko Co., Ind., Oct. 17, 1932. George Gould, 1 ♂, 1 ♀. Kosciusko Co., Ind., July 4, 1932. George Gould, 1 ♂, 1 ♀. ILLINOIS: We have: Piatt Co., Ill., IX/25/32. George Gould, 1 ♂, 1 ♀. OHIO: We have: Paulding Co., Ohio, Aug. 14, 1932. George Gould, 1 ♂. MICHIGAN: We have: From Bessey Creek, Douglas Lake, Mich. From July 18th through Aug. From 1923-1952. H. B. Hungerford, 93 ♂♂, 129 ♀♀. From Colonial Pt., Burt Lake, Mich., Aug. 5, 1924. H. B. Hungerford, 12 ♂♂, 1 ♀. MINNESOTA: Rochester, Minn., July 16, 1921. H. B. Hungerford, 8 ♂♂, 8 ♀♀. (1 ♀ winged.) KANSAS: Douglas Co., Kans., C. P. Alexander, 23 ♂♂, 2 ♀♀. (1 ♂ winged.) Dykeman's Bridge, July 1922. H. B. Hungerford, 12 ♂♂, 14 ♀♀. (1 ♀ winged.) Douglas Co., July 9, 1920. W. E. Hoffmann, 1 ♂, 4 ♀♀. Doniphan Co., July 20, 1924. R. H. Beamer, 1 ♂. Montgomery Co., Elk City, 1927. H. B. Hungerford, 2 ♂♂, 6 ♀♀. Riley Co., Aug. 3, J. B. Norton, 10 ♂♂, 3 ♀♀. Riley Co., Manhattan, Sept. 13, 1923. H. B. Hungerford, 4 ♂♂, 14 ♀♀. Scott Co., Aug. 22, 1928. R. H. Beamer, 1 ♂ (winged), 2 ♀♀. Hodgeman Co., July 17, 1917, 10 ♂♂, 10 ♀♀. Cherokee Co., Aug. 15, 1920. Hungerford and Beamer, 15 ♂♂, (2 winged) 2 ♀♀. OKLAHOMA: Ar-buckle Mts., Davis, Okla., July 1925. R. H. Beamer, 1 ♀. Fairland, Okla., 9/24/1932. L. D. Tuthill, 2 ♂♂, 1 ♀. TEXAS: Bowie Co., Texas, VIII/16/1928. R. H. Beamer, 3 ♂♂, 2 ♀♀, and VIII/20/1938. Beamer and Shaw, 3 ♀♀. ARKANSAS: Carroll Co., Ark., 9/17/1932. George Gould, 2 ♂♂. Polk Co., Ark., 8/21/1928. R. H. Beamer, 5 ♂♂, 4 ♀♀. TENNESSEE: Reel Foot Lake, Tenn., 1941. Lucile Rice, 8 ♂♂, 5 ♀♀. LOUISIANA: Beauregard, La., 8/16/1928. J. G. Shaw, 2 ♀♀. GEORGIA: Okefenokee Swamp, Georgia, 7/30/34. Beamer and McKinstry, 2 ♀♀. FLORIDA: Plant City, Fla., 8/15/30. Paul W. Oman, 1 ♂. Hilliard, Fla., 8/31/30. Paul W. Oman, 6 ♂♂, 4 ♀♀, 12 nymphs. VIRGINIA: Lake Drummond, Va., 9/10/33. L. D. Anderson, 2 ♂♂. Brunswick, Va., Sept. 15, 1929. G. E. Gould, 2 ♀♀. Norfolk, Va., VIII/11-13/1934. P. McKinstry, 1 ♂, 1 ♀, and IX/28/1928. George Gould, 1 ♂, 1 ♀.

Determinations based on females alone are questionable. While both *R. rileyi rileyi* and *R. rileyi palosi* are found in Indiana, Illinois, Tennessee, and perhaps Florida, I have not found them from the same place. Should they be so found we must look for intermediates and see what we can learn by breeding experiments.

Rheumatobates spinosus sp. nov.

Plate XI, figs. 17 and 17a.

Size: Length of apterous male 1.785 mm; width of head .63 mm; greatest width of body .945 mm.

Color: Black with abdominal dorsum frosted, a pale spot on the pronotum, eyes reddish, margined by brown bands on vertex; beak and antennae infuscated; venter, except the prosternum dark and somewhat frosted. Basal end of first antennal segment, coxae, trochanters, and genital segments pale.

Structural characteristics: Since this unique species is represented by a single damaged male specimen it is impossible to give a complete description. It lacks one antenna, the front and middle legs are gone and only the coxa, trochanter, and basal part of the femur of the left hind leg remain. Yet the antenna and the posterior trochanter are sufficient to recognize this specimen as a new species. The antenna is slightly modified as shown in the drawing.

The segmental formula, 1st: 2nd: 3rd: 4th.: 45: 16: 33: 28. First segment stout, but not incrassate; first and second segments thicker than the others, third segment thin and somewhat curved, fourth segment a little broader, curved with a strong spine near its base. Middle coxae considerably thicker than hind coxae, hind coxae smaller than hind trochanter which is elongate with a conspicuous elongate projection near its base. Hind femur slightly curved with a dense row of hair on inner basal margin. Abdominal venter flat, not hairy, the last segment about as long as the two preceding segments and nearly as long as the first genital segment. In dorsal view the first genital as long as the last two abdominal segments, nearly cylindrical, slightly tapering and somewhat laterally compressed, not hairy.

Location of type: Holotype male in the Francis Huntington Snow Museum, University of Kansas. Described from one specimen labeled "Brazil, S. A. Sept. 1935. A. M. Olalla. Rio Parú, Castanha Region."

Comparative notes: This species stands quite alone. It runs in my key to the section having modified hind legs in the male with the trochanter enlarged, but the very long basal spur separates it at once from *R. klagei*, *R. crassifemur*, etc.

Rheumatobates klagei Schroeder

Plate XII, fig. 20.

1931 *Rheumatobates klagei* Schroeder, Herman O., Kansas Univ. Sci. Bull., vol. 20, no. 2, p. 75-77; pl. VII, figs. 1-2; pl. VIII, figs. 2 and 5; pl. XI, figs. 7 and 8 (desc. from Amazonas, Brazil).

1942 *Rheumatobates klagei* Drake, C. J., and Harris, H. M., Rev. Brasil Biol., 2(4), p. 402.

1952 *Rheumatobates klagei* Drake, C. J., and Harris, H. M., Proc. Biol. Soc. Washington, vol. 64, p. 155.

Size: Length of apterous male 2.27 mm-2.52 mm; of apterous female 2.8 mm to 3 mm; of winged male 3.6 mm; of winged female 3.36 mm.

Color: Although described as "dark velvety brown," this species is typically black. The head black with a fulvous U-shaped band on vertex. The pale spot on the pronotum is the only one always present. The mesonotum black often more or less frosted; no pale spot above mesoacetabula; genital segments may be pale or black. Base of antennae and of legs pale. Venter brown to black.

Structural characteristics: The antennae and hind legs of male modified. The male antenna with basal segment as long as the head including the tylus, more slender than anterior femur and unarmed; second segment very short, third segment about one and one-half times as long as second; fourth segment as long as the first, curved outward in a regular arc, basal third thin and apical two thirds flattened laterally, apex pointed but not hooked. The female antennal formula: 1st: 2nd: 3rd: 4th:: 23: 8: 20: 30. The female with trochanter and femur of hind leg longer than the tibia and tarsus. The trochanter of hind leg of male with base thickened but not globular as in *R. crassifemur esakii* and lacking the dense hair tuft of *R. c. esakii*; the base of the femur with a dense hair tuft that is lacking in *R. crassifemur* and its subspecies.

Location of types: In the Francis Huntington Snow Museum, University of Kansas.

Data on distribution: BRASIL: Described from long series of apterous forms bearing the label, ⁹"Manacapuru S. A. Amazonas, Brazil, Solimoes River 6-26 S. M. Klages," others with the date 4-26.

Since then we have received the following: Brazil, S. A., Jan.-Apr. 1936, A. M. Olalla, No. 1, R. Amazonas. (Nrte) Region de Itacoatiara 27 ♂♂, 36 ♀♀ (5 winged). Brasil, S. A., 9-25, 10/12/36. A. M. Olalla, Vic. Santo Antonio River Eiru, No. 3710, 38 ♂♂ (9 winged). Brasil, S. A., 9/25, 10/17/36. A. M. Olalla, Vic. Santo Antonio

9. Taken with *R. crassifemur esakii* Schroeder.

River Eiru, No. 3712, 5 ♂♂, 2 ♀♀. ¹⁰ Brasil, S. A., State of Pará; Lago Grande, Feb. 1939. A. M. Olalla, 5 ♂♂. ¹⁰ Brasil, S. A., 7/10, 9/20/36. A. M. Olalla, Vic. João Pessoa, (São Phelipe) River Jurua, No. 374. 40 ♂♂ (13 winged). Brasil, S. A., 7/10, 9/20/36. A. M. Olalla, Vic. João Pessoa, (São Phelipe) River Jurua, No. 372, 2 ♂♂.

Rheumatobates crassifemur crassifemur Esaki

Plate XII, fig. 21.

- 1926 *Rheumatobates crassifemur* Esaki, T., Annales Musei Nationalis Hungarici, vol. 23, p. 149-153, figs. 9a-f (desc. from Argentina and Paraguay).
 1931 *Rheumatobates crassifemur* Schroeder, Herman O., Kansas Univ. Sci. Bull., vol. 20, no. 2, p. 74-75.
 1936 *Rheumatobates crassifemur esakii* Drake, C. J., and Harris, H. M., Proc. Biol. Soc., Washington, vol. 49, p. 108 (det. as *R. crassifemur esakii* Schroeder. Reported from Brazil).
 1937 *Rheumatobates crassifemur* Drake, C. J., and Harris, H. M., Rev. de Entomologica, vol. 7, fasc. 4, p. 362 (places their *R. crassifemur esakii* Schroeder from Brazil here).
 1942 *Rheumatobates crassifemur* Drake, C. J., and Harris, H. M., Rev. Brasil Biol., 2(4), p. 402.
 1951 *Rheumatobates crassifemur* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc., Washington, vol. 64, p. 154, Pl. XIIIb (in litt. Drake says drawing is of *R. esakii* Schroeder. However antenna incorrectly shown).

Size: Length of apterous male 2 mm to 2.22 mm; length of apterous female 2.5 mm to 2.86 mm. Winged female 3.28 mm to 3.57 mm. Esaki gives maximum length of female 3 mm and of winged forms 4 mm.

Color: Black, more or less frosted. Head black with flavous U shaped band on vertex; pale spot on pronotum; sometimes pale spot on and above mesoacetabula. Base of antennae and of legs usually pale. Venter usually brown to black.

Structural characteristics: Antennae and hind legs of male modified. The male antenna with basal segment slightly swollen, about as long as the head; second segment short, about as broad as long, with two long hairs on ventral side; third segment more slender and a little longer than the second, with two stout hairs on inner margin; the fourth segment with basal third slender then becoming broader; at its base a pencil of fused hairs directed laterally; the distal two thirds thickened and curved with a row of spaced hairs dorsally on the curve before the tip. The female antennal formula: 1st: 2nd: 3rd: 4th.: 18: 7: 20: 28. The female with the trochanter and femur of hind leg slightly longer than the tibia and tarsus. The trochanter of the hind leg of male with base thickened and a dense

10. Taken with *R. crassifemur esakii* Schroeder.

tuft of hairs present plus a fringe of hairs. The base of femur without a hair tuft.

Location of types: Described from 1 male, 8 females from Posadas, Argentina (June 1900 Silvestri) in the Hungarian National Museum, Budapest. (apterous); two males, three females (Macropterous) and two males and two females. (apterous) from Chaco, Paraguay (Fiebrig), in Natural History Museum, Vienna. I studied the above when in Vienna and Budapest.

Data on distribution: ARGENTINA: The type series above. PARAGUAY: The type series above. BOLIVIA: We have in the Francis Huntington Snow Museum the following: R. Mamores, Trinidad III-1938 A. M. Olalla (60 ♂♂, 120 ♀♀). R. Beni, El Consuelo 1938. A. M. Olalla (41 ♂♂, 82 ♀♀). R. Beni, Puerto Salinas, XI 1937, A. M. Olalla (5 ♀♀). R. Beni, Las Pampas, Mojos, Apr. 1938. A. M. Olalla (4 ♂♂). Santa Rosa del Yacuma, II, 1938, A. M. Olalla (1 ♂, 3 ♀♀).

Rheumatobates crassifemur esakii Schroeder

Plate XII, fig. 22.

- 1931 *Rheumatobates crassifemur esakii* Schroeder, Herman O., Kansas Univ. Sci. Bull., vol. 20, no. 2, p. 77-78; pl. VII, fig. 3; pl. VIII, figs. 3 and 4 (desc. from Amazonas, Brazil).
- 1936 *Rheumatobates crassifemur esakii* Drake, C. J., and Harris, H. M., Proc. Biol. Soc., Washington, vol. 49, p. 108 (later 1937 they say these specimens from São Paulo, Brazil, are *R. crassifemur* Esaki not *R. esakii* Schroeder).
- 1937 *Rheumatobates esakii* Drake, C. J., and Harris, H. M., Rev. de Entomologia, vol. 7, fasc. 4, p. 362 (they raise *R. crassifemur esakii* Schroeder to specific rank).
- 1942 *Rheumatobates esakii* Drake, C. J., and Harris, H. M., Rev. Brasil Biol., 2(4), p. 402.
- 1951 *Rheumatobates esakii* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc., Washington, vol. 64, p. 155.

Size: Length of apterous male 2.05 mm to 2.39 mm. Length of winged male 3.36 mm to 3.78 mm. Apterous female 2.5 mm to 2.94 mm.

Color: Black. Head black with fulvous band on base of vertex. Pale spot on pronotum of variable size. No pale spot above mesoacetabula. Venter brown to black.

Structural characteristics: Antennae and hind legs of male modified. The male antenna differs from other subspecies in having basal segment a little more incrassate and the terminal segment recurved with about four of the dorsal hairs, before the curve, large, stout and close together and longer than in any of the others forms. The female antennal formula: 1st: 2nd: 3rd: 4th.: 18: 7: 20: 25.

The female with the trochanter and femur of hind leg subequal to the tibia and tarsus. The trochanter of the hind leg of the male with base thickened and a dense tuft of hairs but lacking the heavy fringe of hairs present in *R. crassifemur crassifemur*. The base of femur without a hair tuft.

Location of types: Four males in Francis Huntington Snow Museum.

Data on distribution: BRAZIL: Described from "Manacapuru, Amazonas, Solimoes River, VI, 1926. S. M. Klages.

In addition we have in the Francis Huntington Snow Museum the following: ¹¹ Brazil, S. A. Jan.-Apr., 1936, R. Amazonas, Region de Itacoatrora. A. M. Olalla (4 ♂ ♂, 10 ♀ ♀). ¹¹ Brazil, S. A., State of Pará, Lago Grande, Feb. 1939, A. M. Olalla (8 ♂ ♂, 20 ♀ ♀). Brazil, S. A., Utinga, Belen, Para XL-25, 1945 L. Deane (6 ♂ ♂, 2 ♀ ♀). ¹¹ Brasil, S. A., Vic. João Pessoa (São Phelipe) River, Jurua No. 374, VII-10 to IX-20, 1936. A. M. Olalla (46 ♂ ♂). BRITISH GUIANA: Supurini Creek, Aug. 31, 1937, S. Harris (7 ♂ ♂, 5 ♀ ♀.)

Rheumatobates crassifemur schroederi subsp. nov.

Plate XII, fig. 23.

Size: Length of apterous male 2.02 mm-2.4 mm; length of apterous female 2.52 mm to 3.15 mm.

Color: Black but sometimes entirely frosted over to appear gray. Head brown to black with a fulvous band on vertex. Pronotum with pale spot. No pale spot above the mesoacetabula. Base of antenna and of front femur pale. Sometimes middle and hind trochanters pale. Legs otherwise brown. Venter dark, often frosted.

Structural characteristics: Male antennae and hind legs modified. First antennal segment of male moderately incrassate, as thick as the front femur. The dorsal row of bristles on the last antennal segment, quite uniformly spaced and more numerous than in other subspecies. The antennal formula of the female: 1st: 2nd: 3rd: 4th:: 18: 7: 20: 30. The hind trochanter and femur slightly longer than tibia and tarsus in female. The middle femur of the male is incrassate as in other subspecies. The hind trochanter lacks the dense margin of long hairs on the basal lobe that are present in *R. crassifemur crassifemur*. All of the subspecies have the tuft of long hairs on the hind trochanter and lack such a tuft at base of hind femur.

11. Taken with *R. klagei* Schroeder.

Location of types: Holotype, allotype and 21 paratypes (9 ♂♂, 12 ♀♀) in the Francis Huntington Snow Museum, and one pair in Dr. Drake's collection.

Data on distribution: BRASIL: The type series bear the label: Logoa Mecejana near Fortaleza, Ceará, Brasil, S. A., June 14, 1936. Stillman Wright, No. 11062. We have, in addition, the following: Acude Pitombeira, 15 km. from Caicó, Rio Grande do Norte, Brasil, S. A., June 1933. S. Wright, No. 343 (6 ♂♂, 13 ♀♀). Acude Creminosa, Nr. Maranguape, Ceará, Brasil, S. A., Nov. 3, 1937. S. Wright (4 ♂♂, 5 ♀♀). Pernambuco, Brasil, S. A., Jan. 31, 1935. Revino D. Bento (1 ♂, 3 ♀♀).

Rheumatobates imitator (Uhler)

Plate XIII, figs. 25 and 25a; Plate XV, fig. 30.

- 1894 *Hymenobates imitator* Uhler, P. R., Proc. Zool. Soc. London, 1894, p. 214 (desc. from Grenada).
- 1908 *Rheumatobates imitator* (Uhler) Bergroth, E., Ohio Nat., vol. 8, No. 8, p. 380 (says *Hymenobates* Uhler is synonym of *Rheumatobates* Bergroth).
- 1909 *Rheumatobates imitator* Kirkaldy, G. W., and Torre-Bueno, J. R. de la, Catalogue in Proc. Ent. Soc., Washington, vol. 10, p. 212.
- 1930 *Rheumatobates imitator* Wolcott, G. N., Journ. Agri. Univ. Puerto Rico, vol. 20, p. 150.
- 1931 *Rheumatobates imitator* Schroeder, Herman O., Kansas Univ. Sci. Bull., vol. 20, no. 2, p. 69.
- 1939 *Rheumatobates imitator* Barber, H. G., Insects of Porto Rico and Virgin Islands, Hem.-Het. in Scientific Survey of Porto Rico and Virgin Islands, vol. 14, pt. 3, p. 407 (New York Acad. Sci.). (Sent sketch of Porto Rican specimen to Dr. China who compared it with Uhler's type.)
- 1942 *Rheumatobates imitator* Drake, C. J., and Harris, H. M., Rev. Brazil Biol., 2(4), p. 401 (records Porto Rico; Trinidad, B. W. I.; St. Crois, Virgin Isl.).
- 1944 *Rheumatobates imitator* Drake, C. J., and Harris, H. M., Rev. de Entomologia, vol. 15, fasc. 3, p. 272, text fig. 2 of winged female, apterous male.
- 1948 *Rheumatobates imitator* Hynes, H. B. N., Trans. R. Ent. Soc., London, vol. 99, p. 347 (collected in Trinidad, B. W. I.).

Size: Length of apterous male 2.31 mm to 2.6 mm; length of apterous female 2.73 mm to 2.94 mm. Winged male 3.75 mm.

Color: Brownish black to black, somewhat frosted. Pale quadrate spot on pronotum often broader than long. A large more or less diamond-shaped spot on mesonotum. A pale spot above the mesoacetabula often fused with the pale mesoacetabula. Base of vertex fulvous. Thoracic venter pale; abdominal venter may be brown to black in males. Base of antennae, front femora, coxae and trochanters of all legs may be pale; hind trochanter of male usually brown to black as are the middle and hind legs in both sexes.

Structural characteristics: Male antennae and hind legs modified. First antennal segment of male a little longer than the head, basal two thirds slightly swollen and fringed within with long hairs. The

antennal formula of female: 1st: 2nd: 3rd: 4th:: 18: 8: 24: 18. The hind trochanter and femur shorter than tibia and tarsus in female. Middle tibia of the male strongly sinuate; hind trochanter not greatly enlarged, provided with tufts of long hairs, but no toothlike protuberance on dorsomedial margin; femur with a pendiculate stem bearing a T- or anchor-shaped structure on its inner margin. (Compare with *R. mexicanus* Drake and Hottes.)

Location of types: In British Museum.

Data on distribution: GRENADA: Type series "South of Grenville, windward side of island Aug. 4th, on stagnant water. Only one specimen of the winged form is present in the collection. The others are either young specimens, or underdeveloped females without indications of wings. The measurements are taken only from the winged male specimen used for description. The females have the simple antennae and hind legs as in *Rheumatobates* Bergr. and *Metrobates* Uhler. In the female, however, the antennae are very much shorter than in either of the genera just mentioned." PORTO RICO: Recorded by Wolcott 1930, Barber 1939, Drake and Harris, 1942.

We have in the Francis Huntington Snow Museum the following: Mayaguez, Puerto Rico, Aug. 4, 1935. H. D. Tate, 2 ♀ ♀. Mayaguez, Puerto Rico, April 1935, ♀ and ♂. Quebrada, Tomey, VII/11/1935. Needham and Diaz, 3 ♂ ♂. TRINIDAD: Reported by Drake and Harris 1942 and Hynes 1948.

We have from Trinidad, B. W. I., Oct. 27, 29, 1938. Carl J. Drake, 1 ♂. VIRGIN ISLANDS: Reported from St. Croix by Drake and Harris 1942.

Rheumatobates bergrothi Meinert

Plate XIII, figs. 24, 24a; Plate XV, fig. 31.

- 1895 *Rheumatobates bergrothi* Meinert, Fr., Entomologische Meddelelser, vol. 5, pp. 1-8, tab. I and II.
- 1908 *Rheumatobates bergrothi* Bergroth, E., Ohio Nat., vol. 8, no. 8, p. 380 (lists as apterous form of *Hymenobatis imitator*, Uhler in error).
- 1909 *Rheumatobates bergrothi* Kirkaldy, G. W., and Torre-Bueno, J. R., Catalogue in Proc. Ent. Soc., Washington, vol. 10, p. 212 (lists as synonym of *R. imitator* Uhler).
- 1931 *Rheumatobates bergrothi* Schroeder, Herman O., Univ. of Kansas Sci. Bull., vol. 20, no. 2, p. 69 (cites as synonym of *R. imitator* Uhler).
- 1939 *Rheumatobates bergrothi* Barber, H. G., Insects of Porto Rico and the Virgin Islands, Hem.-Het. in Scientific Survey of Porto Rico and the Virgin Islands, vol. 14, pt. 3, p. 407 (N. Y. Acad. Sci. lists Jamaica and Haiti which Drake and Harris 1942 say apply to *R. meinerti* Schroeder).
- 1942 *Rheumatobates bergrothi* Drake, C. J., and Harris, H. M., Rev. Brasil Biol., 2(4), p. 399-400 (report from Panamá).
- 1951 *Rheumatobates bergrothi* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc., Washington, vol. 64, p. 154 (record Panamá, V. I., and Grenada and say *R. bergrothi* Barber 1939 is syn. of *R. imitator* Uhler).

Size: Length of apterous male 2.3 mm to 2.94 mm; of apterous female 2.64 mm to 3.46 mm. Winged female 3.36 mm.

Color: Black. Head black, sometimes a narrow fulvous line at base of vertex. Pronotal pale spot broader than long. Mesonotal spot, more or less triangular, smaller than pronotal spot, occasionally absent. Small pale spot above mesoacetabula. Base of antenna, base of front femur, all coxae usually pale, legs otherwise brown to black. Thoracic venter usually pale, the abdominal venter of male more or less embrowned.

Structural characteristics: Male antennae and hind legs modified. First antennal segment of male a little longer than the head, basal two thirds somewhat thickened; the padlike concavity of the third segment occupying the distal half; the distal half of last segment stoutly serrated on inner margin. The antennal formula for the female: 1st: 2nd: 3rd: 4th:: 20: 8: 28: 19. Hind trochanter and femur shorter than the tibia and tarsus in female. Middle tibia of male slightly sinuate; hind trochanter greatly incrassate with a black protuberance the lateral tooth of which is quite long and sharp; the T shaped structure on the inner margin of hind femur with a straight pedicel, the caudal arm of the T, a broad thin plate. I examined the types in Copenhagen in 1928 and have before me a paratype thanks to the kindness of Prof. Sparck and Dr. Sv. G. Larson. Meinert's drawing of this structure was incorrect.

Location of types: In the Universitetets Zoologiske Museum, Cobenhavn, Denmark.

Data on distribution: GRENADA: The type series taken by Meinert in a little stream north of George Town between the 13th and 25th of May 1891. VENEZUELA: Turiamo Aragua, XI/4/1951. Wm. H. Wells, 7 ♂♂, 28 ♀♀ (1 winged.) This is a new record. PANAMA, (Canal Zone) Fort Clayton, C. Z., 11/11/1932. Capt. R. F. Edwards, 15 ♂♂, 40 ♀♀ and some nymphs. Reported from Panamá by Drake and Harris, 1942.

Rheumatobates meinerti Schroeder

Plate XIII, figs. 26, 26a; Plate XV, fig. 32.

- 1931 *Rheumatobates imitator* var. *meinerti* Schroeder, Herman O., Kansas Univ. Sci. Bull., vol. 20, no. 2, p. 70-71, pl. VI, figs. 1 and 2; pl. VIII, fig. 1 (desc. as *R. imitator* var. *meinerti* from Haiti).
- 1939 *Rheumatobates bergrothi* Barber, H. G., Insects of Porto Rico and Virgin Islands. Hem. and Het. in Scientific Survey of Porto Rico and Virgin Islands, vol. 14, pt. 3, p. 407 (records as *R. bergrothi* Meinert specimens from Haiti and Jamaica).

1942 *Rheumatobates meinerti* Drake, C. J., and Harris, H. M., Rev. Brasil Biol., 2(4), p. 402 (say Barber's *R. bergrothi* from Haiti and Jamaica are *R. meinerti* which they give specific rank).

1952 *Rheumatobates meinerti* Drake, C. J., and Hottes, F. C., Proc. Biol. Soc., Washington, vol. 64, p. 155 (here lists only Haiti).

Size: Length of apterous male 2.52 mm; of apterous female 3.06 mm.

Color: Brownish black to black. Pale spot on pronotum broader than long. Mesonotal spot somewhat diamond shaped, variable in size and doubtless absent in some specimens. Pale spot above mesoacetabula. Base of antennae, front femora, all coxae more or less pale. Trochanters of middle legs of male and of both middle and hind legs of female pale; legs otherwise dark. Thoracic venter mostly pale, abdominal venter of males may be embrowned.

Structural characteristics: Male antennae and hind legs modified. The first antennal segment of the male a little longer than the head, its basal two-thirds about as thick as the front femur. The antennal formula of the female cannot be determined because antennae are broken off in both females available. The straight middle tibia of the male which lacks the long hairs and sinuate shape of *R. bergrothi* identifies this species.

Location of types: In the Francis Huntington Snow Museum, University of Kansas.

Data on distribution: HAITI: The type series. Aux Cayes, 14/6/1894. H. Nepperschmidt. Holotype apterous male. Allotype apterous female and paratypes three apterous males, one female.

INDEX

	PAGE
<i>bergrothi</i>	568
<i>bonariensis</i>	542
<i>carvalhoi</i>	551
<i>citatus</i>	548
<i>clanis</i>	539
<i>crassifemur crassifemur</i>	564
<i>crassifemur esakii</i>	565
<i>crassifemur schroederi</i>	566
<i>creaseri</i>	547
<i>crenitus (vegatus)</i>	544
<i>drakei</i>	541
<i>esakii</i>	565
<i>flavidus</i> subsp. of <i>minutus</i>	546
<i>hungerfordi</i>	554
<i>imitator</i>	567
<i>klagei</i>	563

	PAGE
mangrovensis	537
meinerti	569
mexicanus	552
minutus	545
palosi	560
petilus	540
praeposterus	549
Rheumatobates—key to species	534
rileyi	557
schroederi subsp. of crassifemur	566
spinosus	562
tenuipes	550
trinitatis	536
trulliger	555
vegatus	544
wrighti (= bonariensis)	542

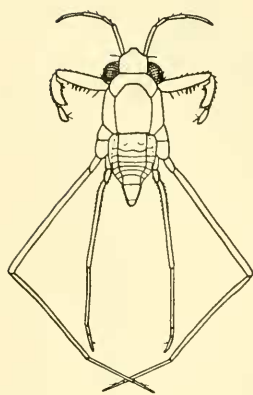
PLATE VII *

1. *Rheumatobates petilus*. Male.
2. *Rheumatobates drakei*. Male.
3. *Rheumatobates bonariensis*. Male.
4. *Rheumatobates minutus*. Male.
5. *Rheumatobates vegatus*. Male.
6. *Rheumatobates clanis*. Male.

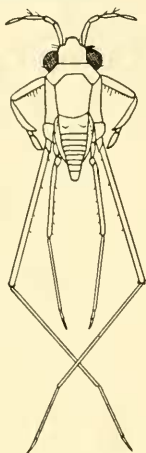
6a. Left front femur of male, in posteroventral view. Note that the spine row is double on basal half and the spines appear short because viewed from above them.

* Drawings on this and following plates made by my research assistant Cheng Liang.

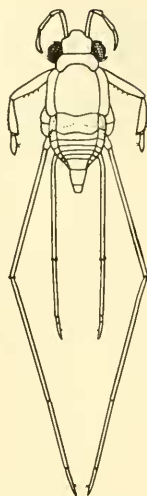
PLATE VII



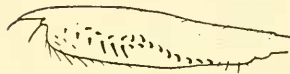
1 *R. petilus*



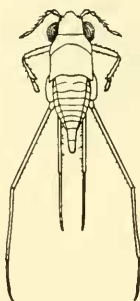
2 *R. drakeri*



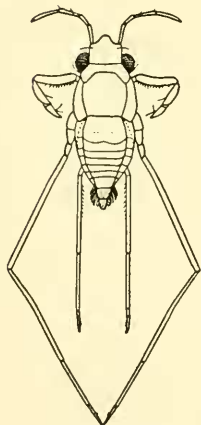
3 *R. bonariensis*



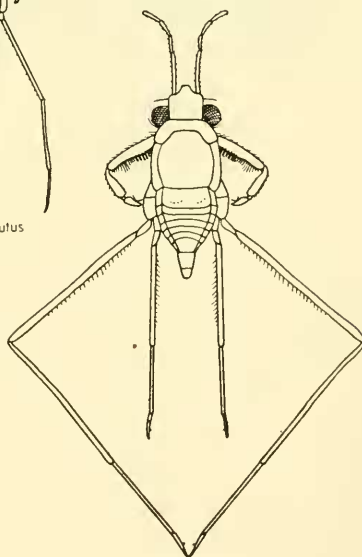
6a



4 *R. minutus*



5 *R. vegatus*

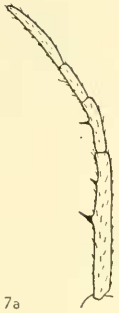


6 *R. clavis*

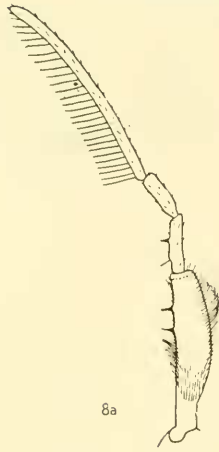
PLATE VIII

7. *Rheumatobates (Hynesia) mangrovensis*. Male.
 - 7a. Ventral view of left antenna of male.
 - 7b. Posteroventral view of front femur of male.
8. *Rheumatobates (Hynesia) trinitatis*. Male.
 - 8a. Ventral view of left antenna of male.
 - 8b. Posteroventral view of front femur of male.

PLATE VIII



7a



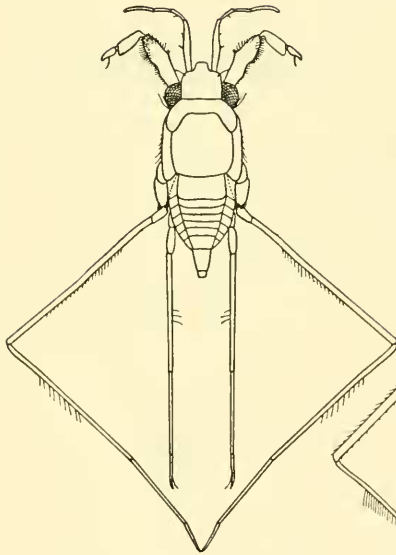
8a



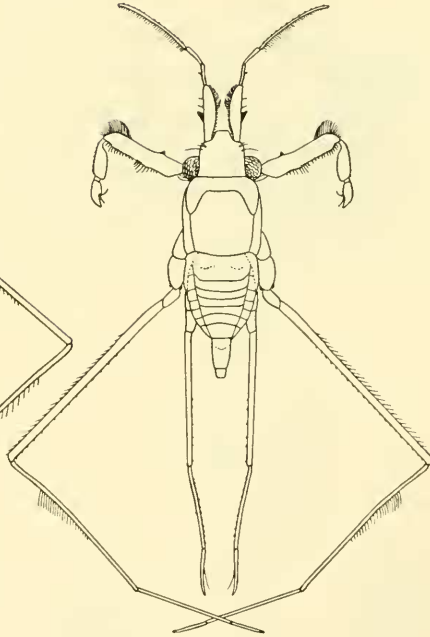
8b



7b



7 R (H) mangrovensis



8 R (H) trinitatis

PLATE IX

9. *Rheumatobates carvalhoi*. Male (redrawn from Drake and Harris).
9a. Under side of abdomen showing the long hairs (hairs not shown on right side of insect).
10. *Rheumatobates creaseri*. Male.
10a. The outside view of the left antenna of a wingless male.
10b. The dorsal view of the left middle femur of male.
11. *Rheumatobates citatus*. Winged male.
11a. The outside view of the left antenna of male.
11b. The dorsal view of the left middle femur of male.

PLATE IX

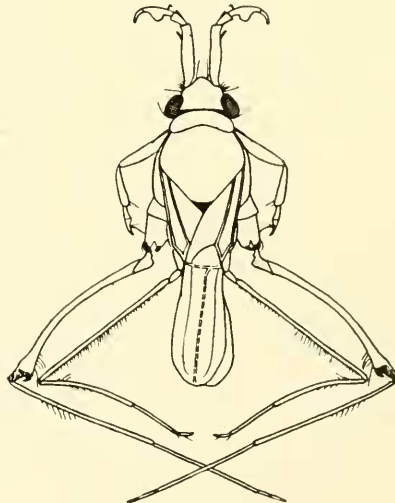
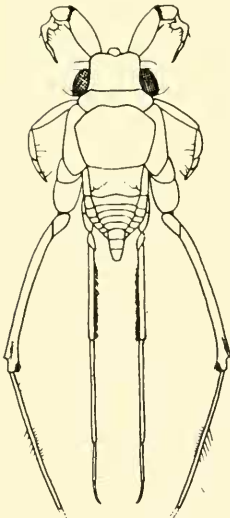
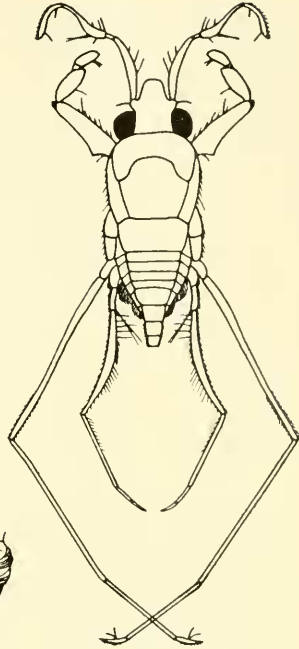
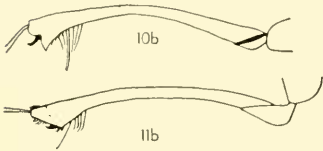
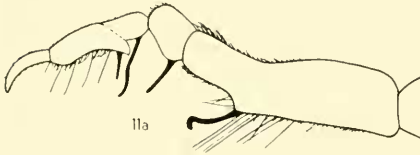
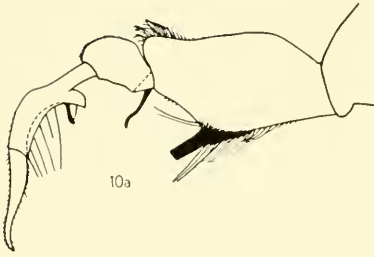
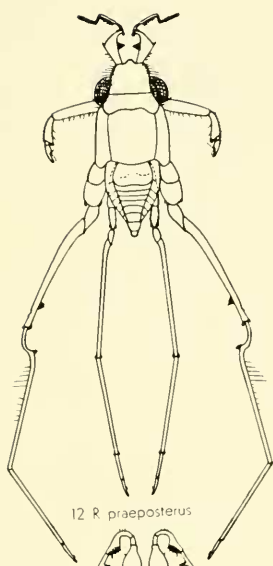


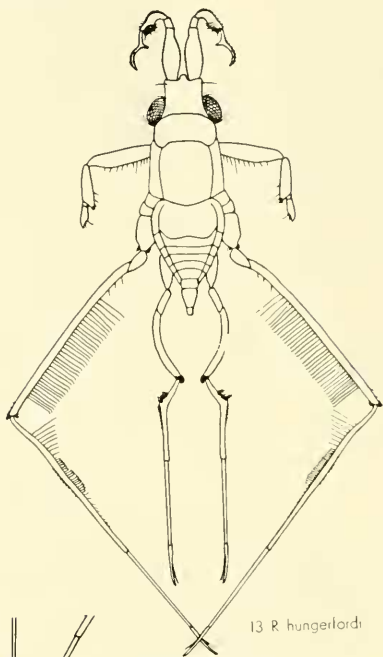
PLATE X

12. *Rheumatobates praeposterus*. Male.
13. *Rheumatobates hungerfordi*. Male.
14. *Rheumatobates trulliger*. Male.
15. *Rheumatobates tenuipes*. Male.
- 15a. Middle and hind tarsi of 15.

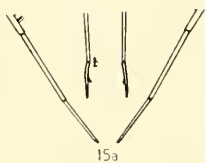
PLATE X



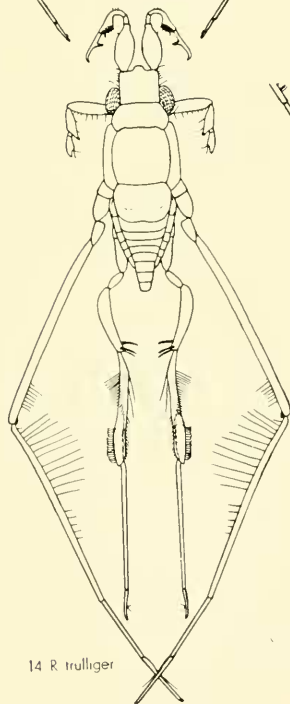
12 *R. praeosterus*



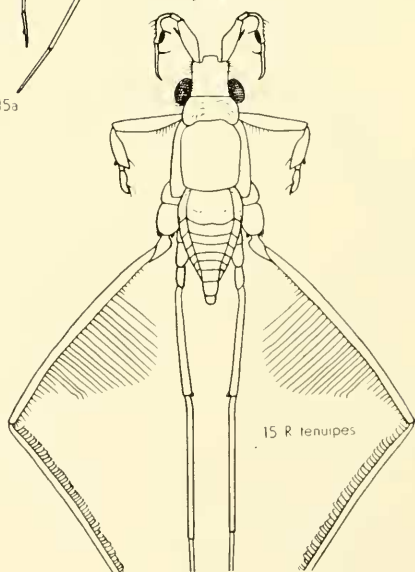
13 *R. hungerlordi*



15a



14 *R. trulliger*

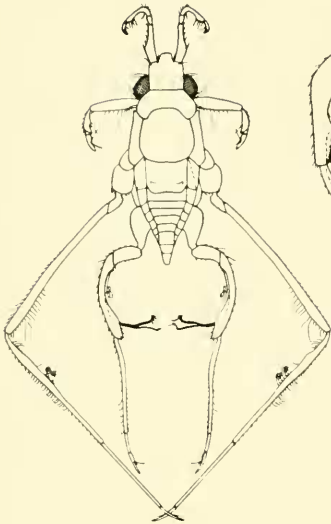


15 *R. tenuipes*

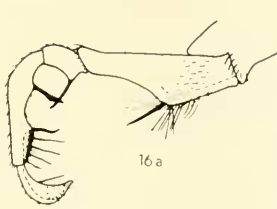
PLATE XI

16. *Rheumatobates mexicanus*. Male.
- 16a. Left antenna—outside view.
17. *Rheumatobates spinosus*. Male.
- 17a. The ventral view of the right antenna of male.
18. *Rheumatobates rileyi*. Male.
19. *Rheumatobates rileyi palosi*. Male.

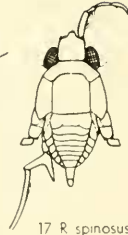
PLATE XI



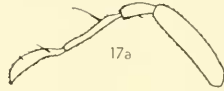
16 *R. mexicanus*



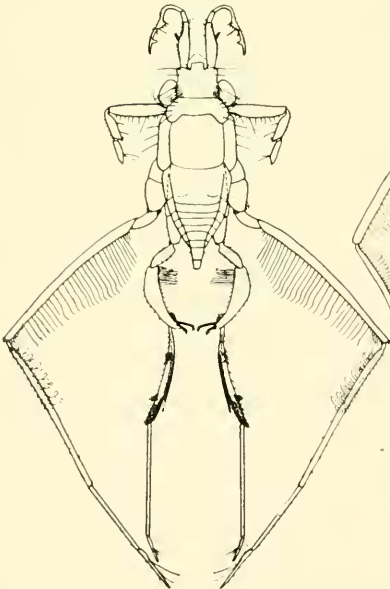
16a



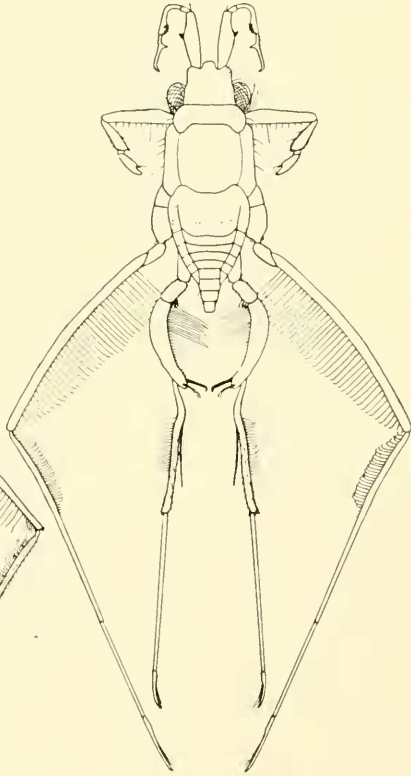
17 *R. spinosus*



17a



18 *R. rileyi*

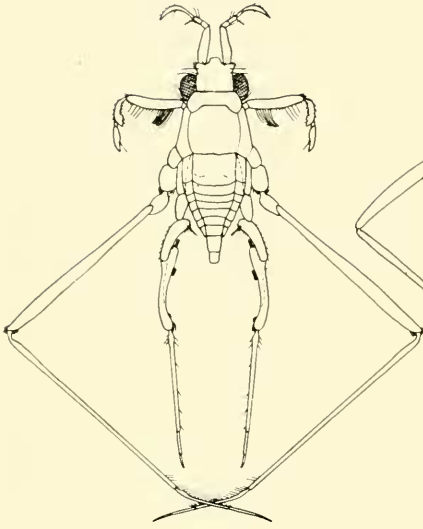


19 *R. rileyi palosi*

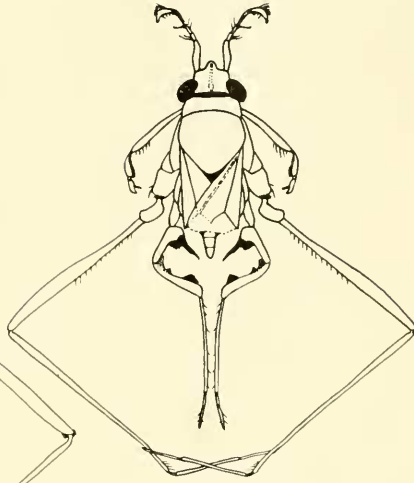
PLATE XII

20. *Rheumatobates klagei*. Male.
21. *Rheumatobates crassifemur*. Male.
22. *Rheumatobates crassifemur esakii*. Male.
23. *Rheumatobates crassifemur schroederi*. Male.

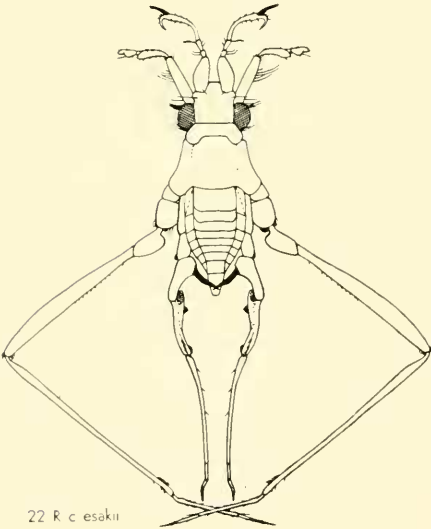
PLATE XII



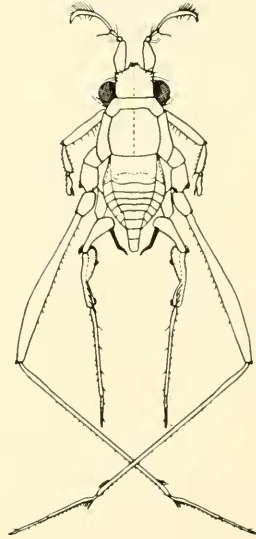
20 *R. klagei*



21 *R. crassifemur*



22 *R. c esakii*

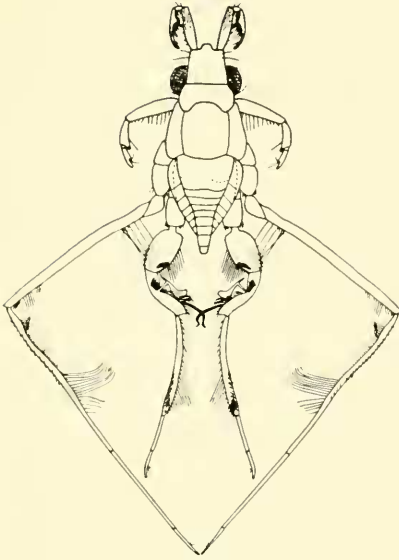


23 *R. c schroeden*

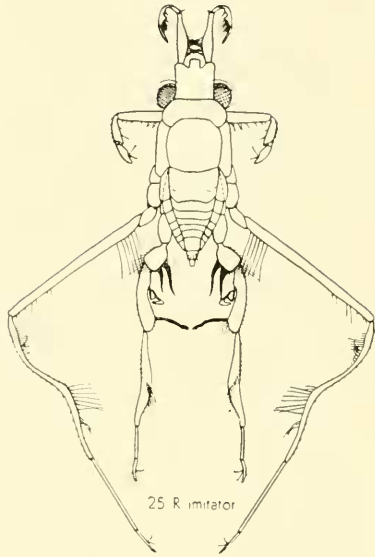
PLATE XIII

24. *Rheumatobates bergrothi*. Male.
24a. Left antenna of male—outside view.
25. *Rheumatobates imitator* (Uhl.). Male.
26. *Rheumatobates meinerti*. Male.
26a. The outside view of the left antenna of male.

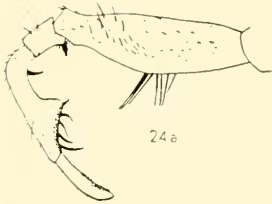
PLATE XIII



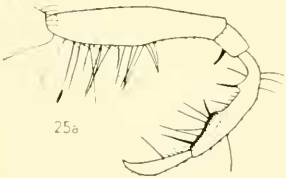
24 *R. bergrothi*



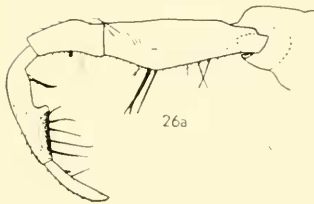
25 *R. imitator*



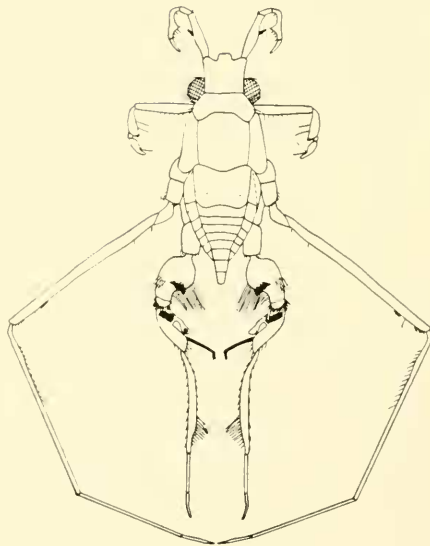
24a



25a



26a

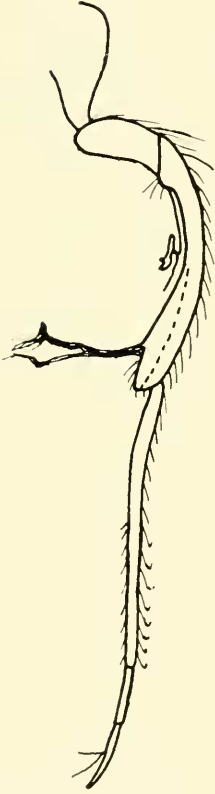


26 *R. meinerti*

PLATE XIV

27. *Rheumatobates mexicanus*. Right hind leg of male.
28. *Rheumatobates rileyi rileyi*. Right hind leg of male.
29. *Rheumatobates rileyi palosi*. Right hind leg of male.

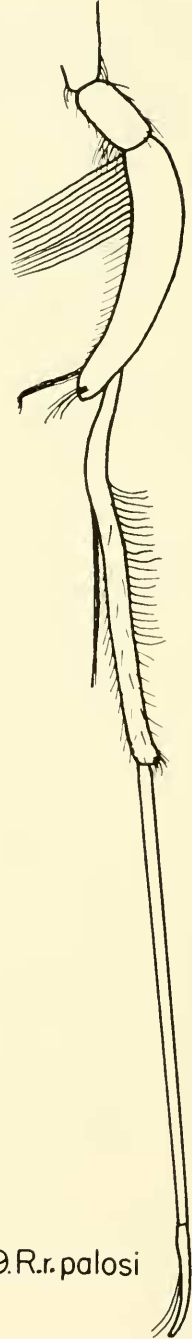
PLATE XIV



27. *R. mexicanus*



28. *R. rileyi*



29. *R. r. palosi*

PLATE XV

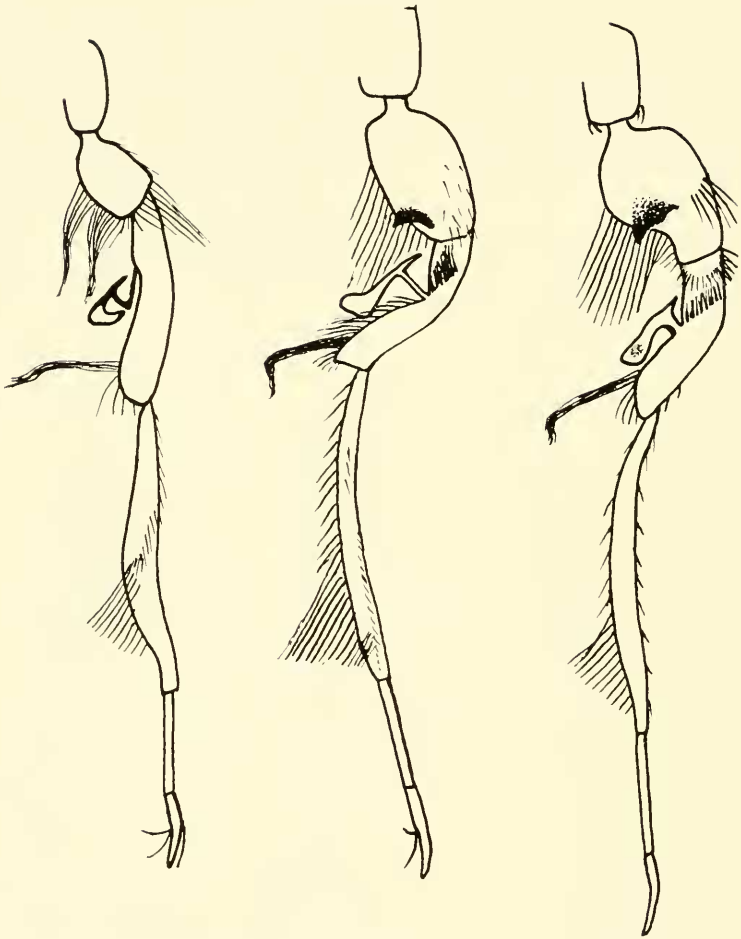
30. *R. imitator*31. *R. bergrothi*32. *R. meinerti*

PLATE XV

30. *Rheumatobates imitator*. Right hind leg of male.
 31. *Rheumatobates bergrothi*. Right hind leg of male.
 32. *Rheumatobates meinerti*. Right hind leg of male.